Machine and Tool

BUUK KLUE

ESTABLISHED 1906

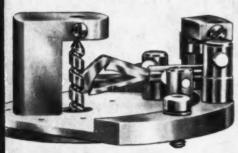
MAY 1954

Study of Chip Breakers **Fusion Welding Titanium Drilling Stainless Steel** Last Minute **Washington News** Letters to the Editor

CONTENTS ON PAGE 5







Increase Bending Speed

A DESIGN and **OPERATING FEATURE** New Type Dial Indicator Fast-Accurate-Economical-Dry cutting

Capacity up to 8" round

Improved MARVEL No. 2 DRAW CUT HACK SAW MACHINE

See your Dealer. If he does not stock MARVEL Saws. he can get them quickly. Or simply write us for literature and delivery. When buying hack saw blades insist that your dealer furnishes genuine MARVEL High-Speed-Edge Hack Saw Blades-they are unbreakable!

because the simple, rugged construction permits the use of high speed

steel blades.

Accurate ... because the improved Saw Frame with clamping type blade holders holds the blade in perfect alignment. and proper tension.

Economical . . . because of its automatic relief on the return stroke, the blade will last and last and last.

Dry Cutting...because modern high speed steel blades will operate efficiently at 60 strokes per minute without a coolant.

ARMSTRONG-BLUM MFG. CO. • 5700 Bloomingdale Ave. • CHICAGO 39, ILL

Nouble Nuty!

KNIGHT'S NO. 50

* Precision Boring * Vertical Milling

Work transfers eliminated—setup time held to the very minimum—these are but two of the benefits offered in the Knight No. 50!

Here is power and speed—exceptional accuracy—rugged strength and rigidity—efficiency and operating convenience—and maximum flexibility to handle an extreme range of difficult and unusual boring and vertical milling jobs, both large and small. Check the specifications and note the unusual capacity provided by the cross table travel and verticle capacity.

Whether used in tool room or production line, Knight's No. 50 promises sizable cost reductions and increased output.

Get the facts...

Mail the Coupon Today!

SPECIFICATIONS

- Table travel-Longitudinal 28"; cross 18"
- Vertical capacity—28"
- Table feeds-Dial type, 16
- Table feeds-per minute, 5/16" to 20"
- Table rapid traverse—both directions 100"
- Spindle speeds, 16-40 to 2000 R.P.M.
- Boring feeds—Infinitely variable, .0000"-.010"
- Horsepower, 71/2
- Weight, 8100 Lbs.

3920 W. PINE BLVD. 37. LOUIS 8, MO.

ATTACH TO COMPANY LETTERHEAD

W. B. KNIGHT MACHINERY CO.

Please send catalog on No. 50 and other Knight Milling machines.

Name _____

Title

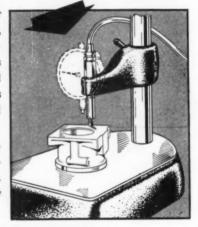
☐ Send information on Knight's 20" and 42" Rotary Tables



USE IT AS YOU WOULD ANY DIAL INDICATOR

Calibrated at our factory on the regular Dimensionair and available in .003", .006", .015", and .030" ranges: It's self-zeroing, so that no further calibrating is needed. Spindle travel of .140" total permits long overtravel. The Airprobe is water and oil-proof and is not affected by coolant on production machinery.

Ask us about this handy new instrument which can be used practically anywhere a Dial Indicator can be used. Federal Products Corporation, 4255Eddy Street, Providence, Rhode Island.

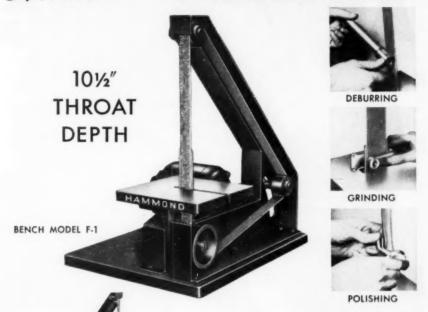


Ask FEDERAL

FOR ANYTHING IN MODERN GAGES ...

Dial Indicating, Air, Electric, or Electronic - for Inspecting, Measuring, Sorting or Machine Size Control

Hammond 1" FLEXIBLE BELT GRINDER



Here is the answer to costly hand filing and costly grinding, polishing and deburring. Deep throat opening of $10^{1/2}$ " permits finishing of irregular shapes and hard to get at areas.

Low in cost, but built up to Hammond standards. Not a "home workshop" tool.

You will be AMAZED at the uses you will find for the F-1.

Clip this ad to your letterhead today. Catalog and price list will be sent at once.

MODEL F-1 WITH DUST COLLECTOR

Hammond Machinery Builders

1614 DOUGLAS AVENUE . KALAMAZOO, MICHIGAN



Are you keeping up with the Armstrong System of Tool Holders

Doubtless you are daily using ARMSTRONG TOOL HOLDERS that have been in continuous operation for many years. This is sound practice, for this means added profits without added tool costs. But to become complacent, so satisfied that you forget your ARMSTRONG TOOL HOLDERS, is unwise. The "Armstrong System" is a growing thing, with new types and sizes of ARMSTRONG TOOL HOLDERS constantly being developed to more effectively meet new machining conditions, or to take advantage of newly developed cutting materials.

With modern ARMSTRONG TOOL HOLDERS for each operation, you can greatly increase speeds and feeds. You can lower machining cost and further increase profits.

If you haven't kept up with the "Armstrong System" write for an ARMSTRONG Catalog and check to see that you are using the most efficient ARMSTRONG TOOL HOLDER for each operation on all lathes, planers, alotters and shapers.

WRITE FOR CATALOG





ARMSTRONG BROS. TOOL CO.

"The Tool Holder People"
5208 W. ARMSTRONG AVENUE CHICAGO 30 ILL

Contents for

| Featured in this Issue As the Editor Sees It Letters to the Editor | 131 | Last Minute Washington News | 145 |
|--|---------------------------|--|---|
| FEATU | IRED | ARTICLES | |
| Chip Breakers | | *************** | 153 |
| By Erik K. Henriksen Increase Bending Speed From 288 to 456 I Fusion Welding Titanium By Francis H. Stevenson | Pieces | Per Hour | 166 176 |
| Automation Produces Refrigerators For W Practical Hints On Drilling Stainless Steel By G. L. Stevens | /esting | house | 186 |
| New Dial Indicator Design Features Only | Four M | foving Parts | 198 |
| By Robert C. Souers Specialized Skin Milling Machine For Airc Foremanship Forum: What Is The Situation By Edmund Mottershead | raft Inc. | dustry w To Get Your Ideas Across | 211 213 |
| MODERN T | OOL | S IN ACTION | |
| Portable drilling, tapping machine lowers Cutting quarts with flexible shaft machin Lima drive used on Oliver lathes | semi-osolar complishously | rutomatic machine ned with vacuum n ground with Diaform | 236 237 238 240 245 246 247 |
| SHOP HINTS | | | |
| Low cost face plate registers Unique tube spacer forming die Shortening drills lengthens life Precision production arbor Accurate gage checks critical dimensions Inexpensive jack screw Assembling threaded stud to work Suggestion for hand tool holder Improved wood protective jaws for a ma | | | 226 227 227 228 236 231 231 |
| DEF | ART | MENTS | |
| Technical Books What's New in Metalworking Available Literature The Market Place | 277 359 | Mechanics Through the Ages Products Index Index to Advertisers | 413 |

EDITORIAL STAFF

Wm. F. Schleicher, editor; M. Bryan Baker, associate editor; E. McDaniel, associate editor; Arnold Kruckman, Washington editor; Paul Prikos, vice-president, Prikos & Becker Tool Co., consultant tool and die editor.

EDITORIAL ADVISORY BOARD

M. John Ahlstromer, asst. chief engineer, Chicago Screw Co.; Ronnie Burritt, charge of machining, Wells Mfg. Co.; John V. Carlson, gen'l. supt., Union Special Machinery Co., Harry Conn, chief eng., Scully-Jones & Co.; Roger Fardig, supt., B. F. Gump Co.; Homer F. Griffith, asst. works mgr., Ind. Power Div., International Harvester Co.; Joe Kosinski, works mgr., Scully-Jones & Co.; Paul Prikos, vice pres., Prikos & Becker Tool Co.

BUSINESS STAFF

R. C. Van Kampen, president; Vincent C. Hogren, vice-president; J. E. Hitchcock, vice-president; M. L. Yonts, secretary and production manager; Herbert I. Sterling, circulation manager; Robert Mackay, art director.

Hitchcock Managers are Listed on Page 64

8

Accepted under section 34.64, P.L.&R., Authorized Office, Chicago, Ill.

Copyrighted, 1954 by the Hitchcock Publishing Co., 222 E. Willow Avenue, Wheaton, Illinois





"Those who buy Gilbert buy Gilbert again" because of the efficiency of the single spindle and unit head design, ample capacity for most boring requirements, plenty of power for fast and heavy cuts with carbide tools, sustained accuracy in long, hard service. 3½-inch spindle, table and floor type boring mills available in a wide variety of arrangements. Write for Bulletin 953.

GILBERT

THE CINCINNATI GILBERT MACHINE TOOL COMPANY . 3366 BEEKMAN STREET, CINCINNATI 23, OHIO



METAL IS SHEARED OFF

by abrasive stones which produce chips from dust to curly chips up to 6 inches long.

ACCURACY

is guaranteed because all surface irregularities are eliminated to tolerances as close as $.0001~(\pm)$.

REMOVE AS MUCH AS 1/16 INCH AT 1½ TO 2 CU. INCH PER MINUTE

for ferrous and nonferrous metals, glass, plastic, etc.

Photographed in plant of THE HUNT-SPILLER MFG. CORP. BOSTON, MASS.

SURFACE FINISH OF AMAZING SMOOTHNESS results from the self-sharpening abrasive which will not smear or distort the surface and produces a uniform finish on all parts of the bore. Identical finishes may be duplicated by the same honing set-up. Any degree of roughness may be attained from 1 to 100 micro-inches rms.

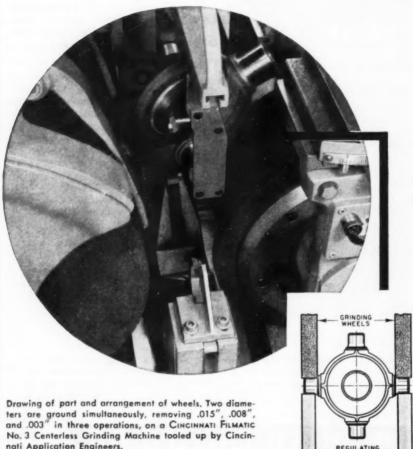


1242 First National Bank Bldg.

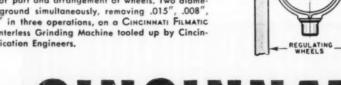
Cincinnati 2. Ohio

for our bulletin on honing.

CINCINNATI FILMATIC No. 3 **Grinds Two Diameters Requiring**



nati Application Engineers.





CINCINNA

CENTERLESS

7X Swing

New applications for CINCINNATI Centerless Grinders are always popping up. The latest is illustrated here ... a two-wheel setup to grind simultaneously two trunnion diameters on universal joint spiders. Swing required for the center section is approximately 7 times the ground diameters. ¶ Cincinnati Application Engineers tooled up a CINCINNATI FILMATIC No. 3 Centerless Grinding Machine for the job. Equipment includes profile hydraulic truing units over the grinding and regulating wheels; special grinding wheel guard and regulating wheel housing to permit loading; automatic infeed attachment; hydraulically operated loading fixture; manually operated grinding wheel spindle reciprocating attachment. With the latter attachment, the operator touches up the shoulder and radius adjacent to the ground diameters. Tyou probably have precision grinding operations in your shop that could be centerless ground on a Cincinnati at lower cost. It will pay you to reconsider your present methods, and our Application Engineers will help you decide. Meanwhile, you may obtain literature by writing to ...

CINCINNATI GRINDERS INCORPORATED

Subsidiary of The Cincinnati Milling Machine Co.



CINCINNATI FILMATIC No. 3 Centerless Grinder. Write for catalog No. G-570-3. For brief data look in Sweet's Machine Tool Catalog.

Cincinnati Offers the Only Complete Line of Centerless Grinding Machines



No. 0 Catalog No. G-576-2



No. 2 Catalog No. G-611-1



No. 3 Catalog No.



No. 4 Catalog No. G-538-2



No. 5



No. 6

CENTERTYPE GRINDING MACHINES • CENTERLESS GRINDING MACHINES CENTERLESS LAPPING MACHINES • MICRO-CENTRIC GRINDING MACHINES

ACME BROACH TOOLING

FOR ECONOMICAL AND ACCURATE HIGH PRODUCTION OF-



GUN PARTS, LOCK HASPS, LEDGER PLATES, CHUCK JAWS, LOCK SLOTS, INVOLUTE SPLINES, MANIFOLD BODIES, HYDRAULIC CONNECTORS, BUSINESS MACHINE PARTS AND A HOST OF OTHERS. ACME HAS TOOLED THEM ALL!

* DESIGNEERED ... An ABC word coined to describe the creative design-engineering inherent in every product made by Acme Broach Corp.

Let ACME "DESIGNEERED"*
Tooling Machines, Broaches, Fixtures—fulfill your requirements
for accurate high production
parts. WIRE, PHONE or WRITE
TODAY for recommendations—
no obligation.



King - size

Here is one of the year's largest planers. Like all Gray planers from king-size Giants to eager Cubs, it's built for high production, with more original engineering developments and production features than any other planer. They are in such demand that GRAY is the largest planer builder, further proof that Quality doesn't, cost . . . , it pays.

GRAY

The G. A. GRAY Co., Cincinnati, Ohio

Bring Costs Down

with this

4" Plain prinde



It's Today's Best Buy

Gives you all these cost-cutting benefits

- Reduces costs for large or small quantities
- · Ease of set-up
- Precision performance
- · Ease of operation

... because of these cost-cutting features

Variable Speed - Dial Control

Work Rotation

Work Traverse

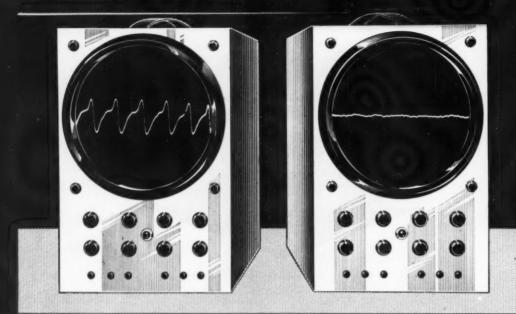
Wheel Feed

Automatic Grinding Cycle

LANDIS

precision grinders

LANDIS TOOL COMPANY / WAYNESBORO, PENNA., U.S.A.



WHEN A STRAIGHT MINERAL OIL was used to lubricate the ways, an 0.0008" jump at frequency of 2.74 cycles per second was noted.

WHEN SUNOCO WAY LUBRICANT was used on the ways, the jump was too small to measure, proof that this medium stops slip-stick motion.

TEST PROVES SUNOCO WAY LUBRICANT ENDS SLIP-STICK TABLE MOTION

How effectively Sunoco Way Lubricant stops slip-stick table motion is graphically illustrated by these oscillograms. The pattern on the left was made with a straight mineral oil as the lubricant; the other was made with Sunoco Way Lubricant on the ways. The patterns on the oscilloscopes are magnifications of changes in rate of table travel and

were obtained under identical operating conditions.

You can stop slip-stick table motion, protect the ways, get better surface finishes, cut production losses with Sunoco Way Lubricant. Try it in your shop. For more information, call your nearest Sun office or write Sun Oil Company, Philadelphia 3, Pa., Dept. MT-5.

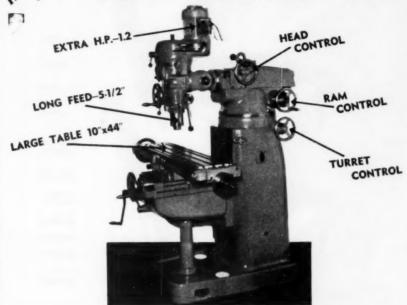
SUN OIL COMPANY



PHILADELPHIA 3, PA. . SUN OIL COMPANY LTD., TORONTO & MONTREAL

Refiners of the famous Blue Sunoco Gasoline and Dynalube Motor Oils

TRISON TURRET-TYPE
THURSDAY VERTICAL MILLING MACHINE



This machine has features, the combination of which is found in no other miller.

Immediate delivery on limited quantities subject to prior sale.

Exclusive Distributors

CHICAGO Donberg & Danits 230 N. Morgan St. Chicago 7, III. PHILADELPHIA
Hochman Machinery Co.
119 N 3rd St.
Philadelphia 6, Pa.

NEW JERSEY & NEW YORK Ralph Hochman & Co. 52 Edison Pl. Newark 2, N. J.

Territories open for established machine tool dealers.
For further details contact your nearest Trison Dealer or write to:

TRISON

MANUFACTURING CO.

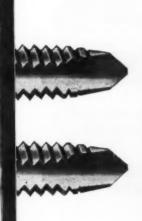
May, 1954

15

UNIFORM and

As alike as two penguins — or, "two peas in a pod" . . . that's the meaning of Bath Tap uniformity.

assured. No need to worry — vou get the same dimensions





Bath engineers check every detail, to see that all Bath Taps are conditioned to do the best threading job for your requirements.

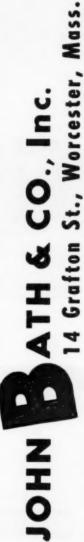
assured. No need to worry — you get the same dimensions on a tap re-order . . . stock or custom built . . . next week or next year.

Uniform manufacture is guaranteed — all Bath Tap measurements are "controlled", including pitch, major and root diameters, shank and pointing — all are concentric with the axis of the tap. Grinding is done while the tap is mounted on center holes . . . precisioned after the tap is hardened.

Bath engineering records preserve for ready reference, a wealth of case history experience in tap design, heat treatment, finishes and operative details on thousands of Bath Taps of all types and sizes.

Bath sales representatives are quite apt to have the answer to your threading problem at their fingertips. This much is for sure . . . once your problem is solved, you can depend on Bath Taps to be UNIFORM in manufacture and performance.

Insist on BATH TAPS for BETTER THREADS



LUG AND RING THREAD GAGES • GROUND THREAD TAPS • INTERNAL MICROMETERS

He never cares
how black his white
collar gets — when
there's a job
to be done
for you!

... Your Morse-





He's an everyday working man, your Morse-Franchised Distributor. He pitches in with your own men, right up to the elbows, when there's a cutting tool problem to be licked. Remember he has the hard-earned experience to do it . . . backed by the tool industry's finest engineering staff and the confidence that comes

of his knowledge that back of him is a complete line of the world's finest cutting tools.

So when you are faced with a tough problem involving cutting tools, send for your Morse-Franchised Distributor. He'll take it off your hands, and clean it up fast and right! Call him today.

MORSE TWIST DRILL & MACHINE COMPANY, NEW BEDFORD, MASSACHUSETTS
(Division of VAN NORMAN CO.) • Warehouses in New York, Chicago, Detroit, Houston, Son Francisco

MORSE Cutting Tools Buy them by phone Franchised From your Morse-Franchised Distributor and save Ordering time



/ Morse Tape

Geaver tool and Engineering

BOX 429, BOYAL DAK, MICH., Teletype - Big Beever 048,

FOR FURTHER INFORMATION WRITE OR CALL



DUST AND CLOSE TOLERANCES DON'T MIX!



ROTO-CLONE Dust Control

Encourages Craftsmanship—Cuts Costs

Ever see a neater tool room? One glance tells you that craftsmanship and pride of product are basic elements of this operation. It would be just the opposite if it weren't for the Type D ROTO-CLONE in upper right corner which is collecting dust from the battery of surface grinders in foreground. Dust is a natural by-product of the tool room but, if allowed to roam, leads to excessive parts wear, inaccurate work and costly repairs.

The Type D ROTO-CLONE has become a "fixture" in those tool rooms that associate dust control with precision work. This complete unit exhausts and separates the fine, abrasive dust and stores the collected material for convenient disposal. Compact design makes its relocation easy with change in process or plant layout. And, with all these advantages, the Type D ROTO-CLONE is the *lowest priced* collector in its class (units of 1500 to 15,000 cfm capacity designed for handling dry, granular dust).

Remember—you can't tolerate dust if you're working to close tolerances. For complete information on the Type D ROTO-CLONE, call your local American Air Filter representative or write us direct for free copy of Bulletin 272.

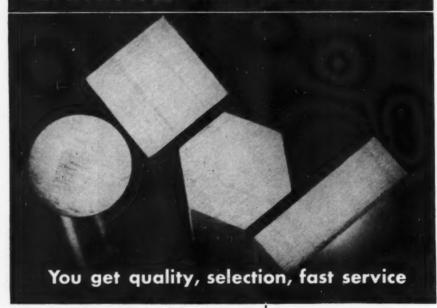
American Air Filter



COMPANY, INC.

312 Central Avenue, Louisville 8, Kentucky American Air Filter of Canada, Ltd., Montreal, P. Q.

WHY IT PAYS TO BUY COLD FINISHED BARS FROM US



You will save money buying your cold finished bars from U.S. Steel Supply. We carry complete stocks of all the shapes and sizes that are in common demand. All are manufactured from the world's leading quality steel-United States Steel. And we will work closely with you to select exactly the right quality for your requirements-and the right quality is not always the most expensive.

You needn't tie up money and space in large inventories of cold finished bars . . . we can quickly supply whatever you need. Call us for: cold finished rounds, squares, hexagons, flats and precision shafting in all grades; cold finished screw stock, Bessemer rounds, "MX" high speed screw stock.

TRIPLE SECURITY

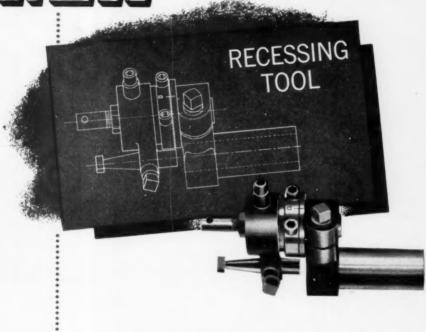
What you want When you want it At the right price

U. S. STEEL SUPPLY



General Offices: 208 So. La Salle St., Chicago 4, Ill. Warehouses and Sales Offices Coast to Coast

ADDITION TO Rand L TOOL FAMILY



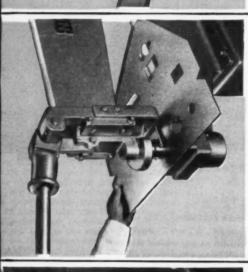
Newly designed, THE R and L RECESSING TOOL is available in three standard sizes, (%", ¾", and 1" shank). The tool can be adjusted to operate on any internal diameter within capacity of machine... also adjustable to operate on outside diameters, (cutting grooves, chamfering, cutting clearance at end of threads, etc.) THE R and L RECESSING TOOL may be operated with spindle running right or left.

Write for catalog



TURNING TOOL - CARBIDE OR ROLLER BACKRESTS - RELEASING OR NOM-RELEASING TAP AND DIE HOLDERS, (ALSO FURNISHED FOR ACORM DIES) - UNIVERSAL TOOL POST - TURNET BACKREST HOLDER - CUT-OFF BLADE HOLDER RECESSING TOOL - REVOLVING STOCK STOP - FLOATING DRILL HOLDER - KNURLING TOOL

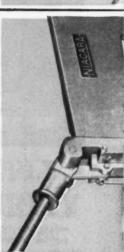
Look at a few of the many jobs this one machine can do



INIACARA.

Punching Sheet

Punching Channel



Cutting Inside Shapes





Shearing 3/16" Plate



Center Slitting 48" Wide Sheet



Notching Angle Iron

It's the NEW Niagara No. 5-24 Lever Punch & Shear

Yes, this versatile new machine can do all these things and more. With a 5-ton capacity and a 24-inch throat, it is ideal for diversified operations in industrial sheet metal shops, maintenance departments, experimental and model shops.

Equipped (optionally) as a punch or shear or both, it is readily converted from one to the other. A large selection of punches and dies is available for handling a tremendous variety of work.

HERE'S THE COMPLETE STORY
Bulletin 79-B contains detailed information and
specifications, Write for
your copy.



NIAGARA MACHINE AND TOOL WORKS, BUFFALO 11, N.Y. DISTRICT OFFICES. DETROIT & CLEVELAND & NEW YORK & PHILADELPHIA Declers in principal U. S. cities and major foreign countries

America's Most Complete Line of Presses, Shears, Machines and Tools for Plate and Sheet Metal Work

A NEW KIND OF GRINDER THAT GIVES **Continuous Low Cost Production**

The Head Swings to Grind Here

ON SEQUENCE GRINDING

While Work is Loaded or Re-Positioned Here

the 718 BESLY-BOWEN Radial Head Face Grinder

- Multi-station Fixturing Permits Continuous Grinding of Sequence Operations—No Interference Between Loading and Grinding.
- · Automatic Grinding Cycle.
- · Automatic Size Control.
- Fixturing Flexibility Each Rotating Station May Hold Several Fixtures, Depending on Number of Faces to be Ground.
- · Single, Massive Slow-Moving Bearing Insures Accuracy with Four-Way Compound Movement . . . Up — Down — Back and Forth.
- A Wet Grinding System Free from Flying Water and Spray.

Available in four models from 5-100 H.P. Write for a full Description of This Type of Grinder.



BESLY GRINDERS AND ACCESSORIES
BESLY TAPS, DRILLS, REAMERS, END MILLS
BESLY-TITAN ABPASIVE WHEELS BESLY TOOL BITS

ON ONE JOB, it grinds three surfaces of a large automotive flywheel housing at a rate of one completed housing every 72 seconds! Accuracy held on this hard-to-grind thin sectioned piece is also note-worthy: with approxi-mately 3/32-in. of stock removed from each face, work is held parallel within .003-in., flat within .005-in. and to size within .010-in.

Phantem

View

BESLY-WELLES

CORPORATION

Established as Charles H. Besly and Company in 1875 122 Dearborn Avenue, Beloit, Wisconsin



Meet the BIG 4 in REINFORCED WHEELS

Famous Norton team features strength, versatility and safety...plus the value-adding

"TOUCH of GOLD"

Here's a Norton wheel family that's closely related in a number of ways that add up to better grinding for you. Each has strong, laminated construction that provides much more than the usual margin of safety. Each is designed to cover a wide range of everyday grinding jobs. And each is engineered to give you fast, trouble-free, economical grinding — the true "Touch of Gold" — every time you put it to work.

The "Big 4" make up a well-balanced team, consisting of two sturdy hub-type wheels (BD rigid and BFR semi-flexible); one straight wheel (BF semi-flexible); and one cut-off wheel (BN). All are resinoid bonded.

The accompanying action shots can only

hint at the "Big 4's" practically unlimited usefulness. Why not find out just how much time and money they can save you on your own grinding applications?

Ask your Norton distributor

to demonstrate the Norton family of Reinforced Wheels in your shop. He knows the types and sizes you need, will be glad to help you in any grinding problems, and will call in a Norton Abrasive Engineer, if necessary. Or write to NORTON COMPANY, Worcester 6, Mass. for the Brand New Catalog on Reinforced Wheels. Distributors in all principal cities, listed under "Grinding Wheels" in your classified phone directory. Export: Norton Behr-Manning Overseas Incorporated Worcester 6, Mass. W-1548



BF Semi-Flexible. A straight wheel with cotton fabric construction. Ideal for deburring jobs, including stampings too large for tumbling. Also for blending and smoothing light welds and curved surfaces, removing flash from plastics, etc. For grinding on periphery only.



BF Mounted Wheels and Points. Same laminated construction as BF wheels. Like all Norton mounted wheels and points they're trued on their own spindles. Available in a wide variety of sizes and shapes for polishing die cavities, chamfering, Brinnell spotting, etc.

BD Rigid Hub-Type.
Glass cloth and Nylon reinforcement. For heavier
stock removal, smoothing
flame-cut edges, slotting,
notching, cutting-off and
many other jobs where
finish is less essential.
Bridges the gap between
the BFR wheel and the
conventional cup wheel
for portable grinding.



BFR Semi-Flexible
Hub-Type. Cotton fabric
and Nylon reinforcement. Most popular light
snagging wheel. Also useful for weld smoothing,
blending contours, light
finishing, removing scale,
notching gates and risers,
minor cut-off jobs, etc.
Reaches hard-to-get-at
places.



BN Cut-Off. Glass cloth reinforcement. One of the safest, longest-lasting cut-off wheels in industry. For cutting-off gates and risers from non-ferrous castings, cutting wire rope, cutting many non-metallic materials, notching, slotting railway track welds, etc.

NORTON A B R A S I V E S

Making better products...
to make other products better

OLIVER DIE MAKING MACHINES Are BEST for Your Toolroom

Because . . . their efficiency, speed and accuracy in machine sawing, filing and lapping save time and cut costs up to 60%. Simple to operate, OLIVER DIE MAKERS further reduce costs because they do not require expensive, hard-to-get skilled labor.





For nearly 40 years OLIVER DIE MAKING MACHINES have proved invaluable on such jobs as production Filing, Experimental Work, Metal Patterns, Cams, Gages, Templates, etc.

OLIVERS have proved their worth in over 10,000 installations throughout the world. Many of these superior, long-lasting Die Makers have been in continuous use for more than 25 years.



The Bench Model S-1 (illustrated) is a single speed die maker for use on tool steel up to 1" thick.

The Heavy Duty Model (illustrated) has 6 speeds, works in metal up to 3" thick, has variable strokes to 5" with hydraulic feed.

Write Today For Complete Technical Data on **OLIVER DIE MAKERS**

See our catalog in Sweet's Directory

OLIVER INSTRUMENT

1408 E. MAUMEE /- ADRIAN/ MICHIGAN FACE MILL GRINDERS

MACHINE TOOLS by OLIVER include:

AUTOMATIC DRILL GRINDERS TOOL & CUTTER GRINDERS DRILL POINT THINNERS

PUTNAM END MILLS are HIGHEST QUALITY



Highest Quality is derived from years of experience, continued dedication to functional research, pride in accomplishment and unexcelled manufacturing facilities.

Throughout the entire Putnam line of end mills (there are over 1200 standard sizes and types) you will find strong evidences of superior design and workmanship. For example: The ability of Putnam End Mills to last longer, and cut cleaner when operated at high speeds and heavy feeds on tough milling operations is indicative of their higher quality.

A trial of Putnam Quality on Your toughest milling job will surely convince.





Maximum operator utilization is yours with the BME-24 twostation universal Burr-Master for high production gear deburring and chamfering of spur and helical gears as well as straight and involute form splines.

Both stations can be tooled identically to handle the same gear, they can perform two different operations on the same part, or operate completely independently, turning out large volumes of two entirely different gears. Only one operator is required with any of these setups. At each station you can chamfer the entire tooth form and root at the rate of 5 teeth per second. High volume isn't all you get with the Burr-Master. Quick and simple changeover and long-life form tools lick the problem of down time and the need for skilled operators.

Complete details in Bulletin 103-60. Ask for it.





Seven of these bolts hold 3500 H.P. reciprocating engineworld's largest—to wings of modern airliner.

With every type of threading equipment available, the National Automatic Products Company of Berlin, Conn., selected Hanson-Whitney Hydraulic Thread Millers to produce this critical threaded part. Thread concentricity must be within 0.002" of the entire bolt length, with pitch diameter tolerance held to 0.0015". Part hardness is Rockwell 34-38, C scale.

Throughout a long term production program, more than 33 of these bolts are produced satisfactorily every hour on the H-W Thread Millers. Result-drastically reduced operating time, lowered costs and improved quality.

Write for information on the complete line of Hanson-Whitney Thread Millers and for the name of your nearest distributor.

HANSON-WHITNEY COMPANY

Division of Whitney Chain Company, Hartford 2, Connecticut, U. S. A.

2385

clocked at 5800%



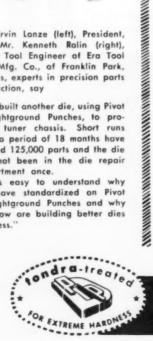
INCREASE PRODUCTION AT ERA TOOL AND MFG. CO. MORE THAN 65 TIMES!

Three of the eleven holes to be perforated in .042, 34-hard, clock brass were to be .019, .023 and .027 - holding .0004 tolerance with 125 micro finish or better. That's a tough job - and production with the original die and ordinary punches, using the guill or point guide principle, was 15 to 600 pieces per set-up.

Then the die was equipped with Pivot Straightground Whipsleeved Punches. Production immediately averaged 40,000 - with no rejects - without breaking a single punch!

You, too, can gain the advantages of greater concentricity, accuracy, power and longer punch life, at minimum maintenance cost. Put Pivot Punches to work for you NOW.

SEND FOR FREE CATALOG AND STANDARD PRICES. WRITE DEPT. M.T.



Mr. Ervin Lonze (left), President,

and Mr. Kenneth Rolin (right).

Chief Tool Engineer of Era Tool and Mfg. Co., of Franklin Park,

Illinois, experts in precision parts

"We built another die, using Pivot Straightground Punches, to pro-

duce tuner chassis. Short runs

over a period of 18 months have totaled 125,000 parts and the die has not been in the die repair

"It is easy to understand why we have standardized on Pivot

Straightground Punches and why

we now are building better dies

production, say

department once.

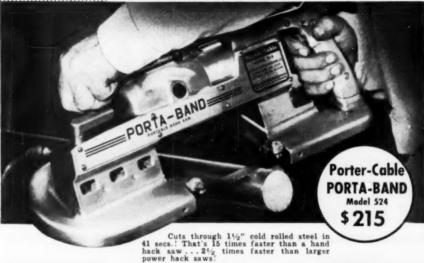
for less."

pivot punch and die corp. NORTH TONAWANDA

34

Portable BAND SAW!

Cuts metal 15 times faster than a hack saw!



Take Porta-Band anywhere around the plant, in stock bins, to equipment yards, out in the field. Portable, compact, light — perfect for general maintenance or teardowns.



In tight, awkward spots like this. Porta-Band delivers smooth, controlled sawing in any position - eliminates fatigue - cuts costs.



Cuts ferrous and non-ferrous metals, "problem" materials, in bar, angle or strip form. Powered for heavy duty . . . handles toughest jobs.

Porter-Cable

Quality Electric Tools

MAIL COUPON FOR COMPLETE INFORMATION

Weighs only 16 lbs. Band speed: 240 f.p.m. Precision ball and needle bearings throughout Universal AC-DC, 25-60 cycle motor (230V available

at extra cost)

PORTER-CABLE MACHINE CO.

2325 N. Salina St., Syracuse 8, N. Y.

(In Canada, send to Strongridge, Ltd., London, Ont.) Send full information on PORTA-BAND and name of nearest dealer. Name.

Company_

Type of Business.

Street_

City-

County_

Manufacturers of Speedmatic and Guild Electric Tools

8½" STROKE 9½" HORIZONTAL TABLE TRAVEL

FULL 8" CUT

Greater
Accuracy
and
Versatility
BOOSTS

tool room production!





A TRULY HEAVY DUTY UNIT

Instrument manufacturers, and tool and die makers find the Shape-Rite Shaper ideal for work that can be machined on a full 8" stroke shaper. Convenient location of controls and simplicity of design, adds greatly on quick set-ups. All working surfaces are ground and hand scraped, and each part is closely fitted to insure highest accuracy and long life. Shape-Rite Shapers are furnished with plain or swivel tables.

MAIL COUPON NOW FOR COMPLETE INFORMATION

| O.K. | Send | m | e | your |
|------|--------|----|----|------|
| bul | letin | on | | he |
| Shap | e-Rite | SI | ia | per. |

| NAME | |
|------|-------|
| | |
| CITY | STATE |

Sales Service Machine Tool Co.

PRESS RITE PRESSES . SHAPE RITE SHAPERS . KELLER POWER HACK SAWS

2357 UNIVERSITY AVENUE . ST. PAUL 4, MINNESOTA





Do Your Bushings do a 100% Job Right from the Start?

Unless they are hard right out to the surface, the answer probably is "NO!"

"Soft skin" may be her pride and joy-but "soft skin" in bushings is strictly persona non grata.

A · B · C Drill Jig Bushings are hardened and guenched by a process which uses an atmosphere of endothermic hydrogen gas. This means there is no "soft skin" and every A · B · C Bushing delivers a 100% job right from the start.

A further feature of A · B · C Bushings is that same fine metallurgical care that goes into A · B · C Precision components for Diesel and aviation engines, and into A.B.C Precision Piercing Punches.

All this, plus careful workmanship and exacting inspection, guarantees unexcelled dimensional accuracy, more holes drilled per hour and lower cost per hole.

The finer accuracy, economy and long life of A.B.C Bushings have made them preferred where highest engineering standards must be met.

Write for price list - and catalog which includes information of value to every person who uses or orders industrial tools.





ACCURATE BUSHING COMPANY

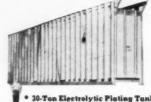


MAIN OFFICE AND FACTORY: WEstfield 2-6400 433 North Avenue, Garwood New Jersey

ENGINEERING OFFICE AND REGIONAL WAREHOUSE: 5722 W. Chicago Ave., Chicago 51, Illinois • ESterbrook 8-7180

REPRESENTATIVES IN ALL IMPORTANT INDUSTRIAL CENTERS WRITE FOR LITERATURE AND NAME OF YOUR LOCAL DISTRIBUTOR Ball Tables for Steel Mill





on a versatile, accurate

Cincinnati Press Brake

At Charles T. Brandt, Inc. speed, accuracy, and versatility are necessary to take care of large or small work in jobbing or production quantities.

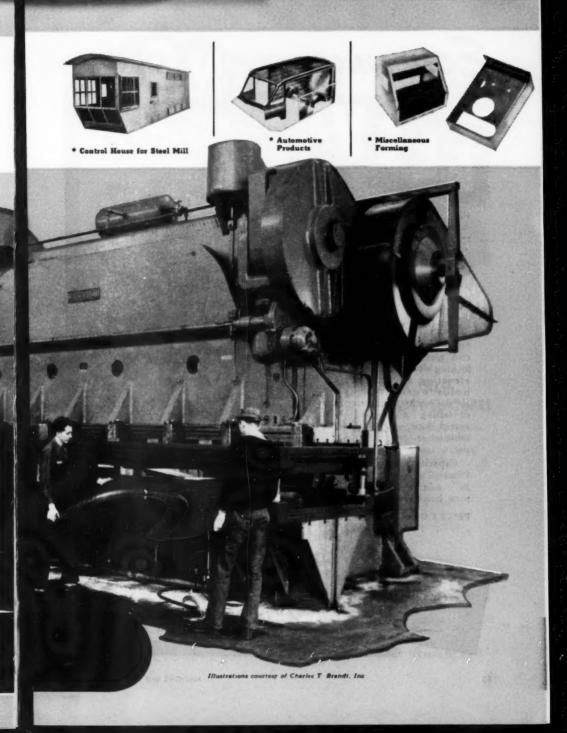
Write for the New 72 Page Catalog B-4. describing operations, features, and special arrangements including wide beds and rams, bed and ram extensions, deeper gaps, higher die space and other features.





THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO, U.S.A. SHAPERS . SHEARS . BRAKES



Economy

For feeding sheet stock, supporting fabricated frames, handling heavy dies, or as a portable work bench. All four sides are accessible to the user.

Lifting and lowering load is hand operated. Crank handle can be attached and operated from either end, with two speed lifting. Self locking worm and screw elevating mechanism holds work at any height without danger of falling. A foot operated floor lock holds table stationery when in use.

Capacity of 2,000 lbs. Dimensions-top 24" x 36", min. height 24", max. height 42".

PRICE F.O.B. CHICAGO

. . \$210.80

ECONOMY ENGINEERING CO. 4505 W. Lake St., Chicago 24, III.





LOW POSITION



Made of Super-Lasting NUPLAFLEX

Nupla Mallets are extremely economical for use in all industries. Four hardnesses—hard, tough, medium and soft—make these mallets the ideal replacements for old fashioned soft-faced types. Minimum sting and rebound reduces user fatigue and provides more accurate and safer blows. Elimination of all projecting parts prevents sparking for safety with inflammables and also makes all head surfaces usable. Start reducing your hammer costs by asking your distributor for an on-the-job test—or write for catalog information.

NEW PLASTIC CORP.

1026 No. Sycamore, Los Angeles 38, Calif.

CHECK THESE QUALITY FEATURES

Massive, Powerful Heads

Conventional Weights, 6 oz. to 1 ½ lbs.

Four Sizes

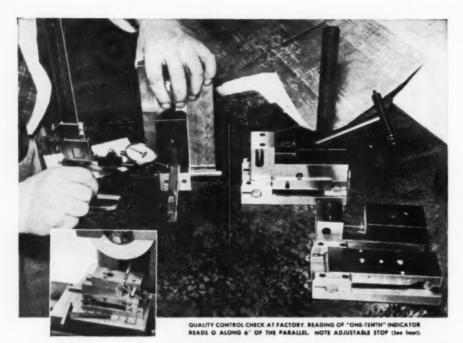
Perfect Balance

GUARANTEED



54

MANUFACTURERS OF NUPLA SOFT-FACED HAMMERS



New J&S Precision Grinding Vise square within 0.0001" or less in 1" in 4 positions

Hardened, Ground and Lapped — Deep Frozen for Stabilization —
Holds Tapered Diameters and Odd-shaped Workpieces

For inspection, grinding, milling, drilling and tapping, jig boring, layout work . . .

This new J & S "Square-perFect" Vise is one of the most practical precision vises ever developed. Its many helpful features explain why:

It is square, for example, with 0.0001" or less in 1" in 4 positions. It is attachable to J & S 5" sine bar with 0.100" recess for small angles.

Accurate, Adjustable Stop

Like all J&S workholding tools, it has a unique downholding clamping action. This assures dependable, accurate positioning of workpieces. An adjustable stop provides fast, sure positions for repeat operations. Workpieces can be loaded and unloaded rapidly.

Holds Tapered, Odd-shaped Workpieces

The clamping jaw of this J & S Precision Grinding

Vise swivels to permit holding of tapered and odd-shaped workpieces. It holds round stock from 1/16" to 2½" in diameter in Vee-block fashion. The range of jaw openings is from 0" to 3".

Get all the facts without delay. Fill-in the coupon and mail it today.

| J & S T | | | | | | | | 1 | h | - Sie | 19 | si | 0 | n, | 9 | d. | J | | | | | | | | | | | | | | | |
|------------------|-----|--|---|---|-----|----|----|----|----|-------|----|----|----|----|----|------|----|---|----|---|----|----|-----|---|---|----|---|---|----|----|----|----|
| Plea Grinding | | | m | | CI | 34 | ng | ol | el | | à | ní | 01 | 70 | nd | reio | 90 | | 01 | | Ac | 24 | ıř | J | 8 | i. | S | P | 21 | 81 | is | ic |
| NAME. | | | | * | | ٠, | | * | * | | | | | | | | | | | | | | | | * | | | | | | | |
| COMPA | NY. | | | | | | | × | | | | | | | | | | | | | | | | | | | | | | | | |
| STREET. | | | | | . 1 | | | | | | | | | | | .,, | | * | | | | | 5 1 | | | 8 | | | | | | |
| CITY | | | | | | | | | | | | | | | | | | | S | T | A1 | re | | | | | | | | | | |



WHEEL DRESSERS . JAW CLAMPS . PRECISION VISES . SINE BARS . DOWN-HOLDING DEVICES

647 W. Mt. Pleasant Ave., Livingston, New Jersey



INSERTED TOOTH SAW

For heavy production cutting of steel, brass, copper and aluminum. Alternating square and bevoled teeth "tri-vide" chips for easy cutting and clearance. Maximum saw clearance gives cooler, freer cutting ... permits extremely high rate of feed. High Speed Steel Teeth can be easily replaced singly or in complete sets, in your own plant.

*** SEGMENTAL SAW**

For especially smooth cuts on production work. Extra-service High Speed Steel toothed segments are securely held in a tough alloy plate by a tongue and groove design, have quick clearance for faster, freer cutting. Teeth are alternately square and beveled for easy cutting and clearance of "tri-vided" chips. Can be sharpened on any automatic grinder.

SOLID TOOTH SAW

For general shop cut-off jobs..., for use on smaller automatic cut-off machines, and for cutting jobs where narrow kerf is important. Clearance ground and furnished in High Speed, Si-Maloy (Pat.), or Semi-High Speed Steel. Simonda own steel, plus accurate heat trenting and grinding give these saws longer life, more dependable performance.



CALL YOUR SIMONDS DISTRIBUTOR TODAY

Factory Branches in Boston, Chicago, Son Francisco and Partland, Oregon Canadian Factory in Mantreal, Que. Simonds Divisions: Simonds Steel Mill, Lockpart, N. Y. Simonds Abrasiva Co., Phile, Pa., and Arvala, Que., Canada

CIRCULAR Metal Cutting SAWS



HOW SMALL PINES Hydraulic BENDERS SPEED

OUTPUT of TV SERVETTE TRAYS

At Quaker Stretcher Co., Kenosha, Wis., four Pines Series 1400 Benders are producing high quality bends for TV servette tray legs at unusually low cost. Two smooth, 90° bends on a 2" CLR are formed in 5/8" x .018" wall, roller-coated, lock-seam tubing without marring the black enamel finish. The machines, costing under \$2000.00 each, are operated by women. High efficiency is maintained. Net production per machine averages 432 bends per hour, and the only scrap loss is a very few pieces while making setups. Pines Series 1400 Benders feature small capital investment, fast, easy operation, and uniform results. Hydraulic actuation assures dependable accuracy, low operating cost.



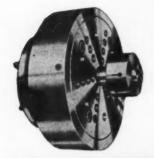
PRODUCTION BENDING . DEBURRING . CHAMPERING MACHINERY



Closeup showing easy-operating manual toggles, simple tooling. Plug mandrel, Ampco bronze wiper die produce smooth, mar-free bends in pre-coated stock.



Write for free copies of "Pines News" illustrating latest cost-cutting bending techniques. Or, call on Pines Engineers for assistance on any job.



CHUCKS

Parts that can be chucked internally can be chucked faster and machined more accurately on SPEED-GRIP Precision Internal Chucks than by external chucking methods. Standard SPEEDGRIP CHUCKS are made in various sizes. They cover a range of bores from one half inch to eleven inches and can usually be purchased right from stock. SPEEDGRIP engineers are at your service to design and build any standard or special chucking equipment you may require.

FIXTURES

SPEEDGRIP fixtures are designed and built for use on single or multiple spindle boring machines; milling machines; drill presses, etc. At the right is shown a tilting type fixture that is used on a No. 150 Baker Drill. Two air cylinders are used for tilting and clamping the work. SPEEDGRIP fixtures hold workparts securely, position them accurately and usually reduce loading and unloading time.



MANDRELS

All SPEEDGRIP Mandrels are made from high grade Alloy Steel, heat treated and ground to precision gages Standard Mandrels are made in ten different nose sizes and use the same bushings as standard chucks. SPEEDGRIP engineers also design and build many special mandrels and welcome an opportunity to help solve your internal chucking problems where special equipment is required.



Folding magnifiers ideal for toolbox, bench, pocket





Write today for tell-all handbook and catalog, "INDUSTRIAL MAGNIFIER, HOW TO CHOOSE AND USE THEM" Highest quality lenses, precision ground and polished, made by Bausch & Lomb, world leader in optical quality and value. Lightweight, extremely durable 1, 2 and 3-lens magnifiers ranging in power from 3X to 20X. These are in the complete line of industrial magnifiers stocked by your industrial supplier, manufactured by Bausch & Lomb Optical Co., 51229 Bausch St., Rochester 2, New York.



-BAUSCH & LOMB— Industrial Magnifiers



With New Heavy Duty

TAP KING tapping attachments

Whether you're tapping in 1½" steel plate, threading ¾" pipe, tapping "blind" in steel castings or open tapping in high carbon forgings—you'll be amazed at the "handling ease" of this heavy duty tapping attachment. Large capacity, greater thread accuracy, ruggedness and easy finger tip control are an unbeatable combination of features found only in the Tap King! The secret is in the heart of the unit which includes: an improved highly sensitive friction clutch; a new helical gearing mechanism, ball and needle bearings and the exclusive 17 tooth spline drive from clutch to tap holder gives a smooth, powerful drive with less strain, wear and vibration. These are only a few of the many features found in the TAP KING. Find out more about this "production" marvel, see how it can increase your production save on tap breakage and parts spoilage, and give you an accuracy and uniformity on large hale operations that you're not getting now.



Write for FREE brochure

giving full details and specifications on the TAP KING and the complete line of Procunier Tapping Attachments.

| PROCUNIER SAFETY CHUCK CO. | |
|---|---------------|
| 14 S. Clinton St., Chicago 6, III. | |
| Gentlemen: Please send your illust giving complete details, specification on the Tap King and your complete attachments. | ns and prices |
| Name | 4 |

Address

CityState

NEW! Larger "Tru-Grip" Tap Holder

The exclusive Procunier "Tru-Grip" tap holder is lighter, smaller in diameter. It affords easier tapping close to walls or shoulders, eliminates "chewed" tap shanks. Holds tap true.

PROCUNIER

Safety Chuck Company 14 S. CLINTON ST. CHICAGO 6, ILL.

For better screw threads at lower costs per thousand pieces

on automatic screw machines, turret lathes and other machines

CONSIDER THIS

The H & G Insert Chaser Automatic Die Head differs in design and construction from all other die heads. It is unique, without a counterpart, in a class by itself.

It employs small, low cost chasers as opposed to conventional and so-called long-life chasers. The latter, in the hands of a good mechanic, expert in

1

grinding, give good results. But, cutting threads in this way can be compared to shaving with an old-fashioned, long-bladed, straight-edge razor; a good tool in the hands

of a barber—but not the average man.

H & G Insert Chasers can be compared to low cost but highly efficient blades used in modern safety razors. They are so cheap that they can be thrown away when dull, or for utmost economy, can be sharpened again and again. With our new grinding fixture, anybody can do a beautiful job. Only a flash grind is required. Girl operators replace a dull set in two or three minutes without sending for a set-up man.

THE EASTERN MACHINE SCREW CORP. 25-45 Barclay Street, New Haven



If threading to Class 3 specifications is troublesome, you would do well to change to H & G Insert Chaser Auto-



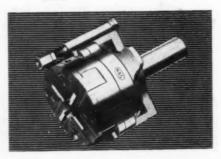
matic Die Heads. They cut downtime to the minimum, keep machines humming and produce smooth, accurate threads.

Write about the possibility of a 30-day trial* giving the make, size and model of machine and the thread size and kind of stock. See what H & G Die Heads will do for you under your conditions.

Ask for our bulletin entitled "SELECT-ING THE PROPER DIE HEAD FOR THE JOB."

H & G Die Heads are made in styles and sizes for all machines on which threads are cut.

BELOW—Style DM for B & S automatics and small spindle machines.



Standard size Die Head and subject to acceptable credit ruting.

Were as Close to You

AS YOUR NEAREST

WETER & MERRYLLATRIER

DEALER—

he's a good man

he's a good man to know!

Let your nearest M. & M. desler give you the complete stery on circular saw blades and face milling cutters. Triple-Chip Saw Blades cut off any machinable material, ferrous or non-ferrous, large or small, any shape, any thickness. Get the complete story, too, on alitting saws in all sizes and thicknesses, as well as on special saws. Our dealers and sales engineers will welcome an opportunity of talking with you about any problems you may have in this field.

THE MOTCH & MERRYWEATHER MACHINERY CO.

Cutting Tool Manufacturing Division CLEVELAND 17, OHIO M. & M. saw blades range from the big 108" diameter Triple-Chip segmental cut-off blade down to slitting saws 3" in diameter.

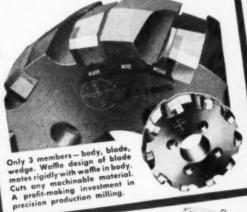
NOTICE ALTERNATION SINGLE AND DOUBLE CHIPS

Triple-Chip solid blades, 8" through 20"

Triple-Chip solid blades, 8" through 20" diameter for cutting off smaller stock.

The M & M. Triple-Chip grind reduces tooth strains, lengthens, blode life, and speeds production with accuracy.

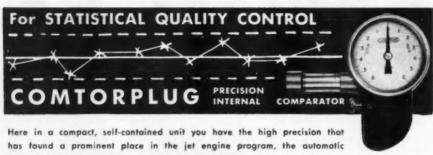
THE MOTCH & MERRYWEATHER
KROSLOK MILLING CUTTER...



Motch & Merryweather Triple-Chip Heavy Duty Anti-Weld Soluble Oil.



M. & M. Master-Cut sktting and slotting saws, with optional Dual Drive. 3" through 8" diameter.



transmission program and other fast moving set-ups. Used at machine or bench, Comtorplug has self-aligning features assuring accuracy. Ideal for Statistical Quality Control programs. Comtor Co., 62 Farwell St., Waltham 54, Mass.

Write for "Bulletin 48"



COMTOR COMPANY REPRESENTATIVES

Barwood & Company 3137 North 15th Street Philadelphia 32, Pa.

Doiph Boettler Company 6625 Delmar Blvd. St. Louis 5, Mo.

Gerald B. Duff & Company 68 Clinton Avenue Newark 5, New Jersey

Louie A. Gain 44 Spruce Berkeley, California

F. D. Huntington Co. 9101 East Jefferson Ave. Detroit 14. Michigan

M. L. Levis Fairview Park 4594 West 214th St. Cleveland 26, Ohio

Proctor & Martin Co., Inc. 297 Franklin Boston, Mass. Franklin St.

L. D. Supply Company 436 Maple Street Wichita, Kansas

Walter R. Olt 06 Abingdon Road Dayton 9, Ohio

Harold E. Sundberg Ellicott Square Buffalo 3, New York Conant Broach Company 347 West 107th Street Chicago 28, Illinois

Gerhart M. Cooke 4760 East Olympic E Los Angeles 22, Calif.

Engineering Sales Company 112 Portwood S Houston, Texas

and 1965 S. Harwood Dallas, Texas

Severance Tools of Canada, Ltd 1232 Eglinton Avenue West Toronto, Ontario Canada

5 MINUTES PER PIECE WITH THIS VERSATILE NEW HMILLING MACHINE



Speeds fabrication of aircraft parts from 75ST aluminum alloy

HERE ARE THE FACTS ON THIS JOB:

Location: - Mar Vista Engineering Co., Los Angeles, Calif. Machine: - 5 hp, No. 2, Model CH, Plain Style used with Universal Milling Attachment. Aircraft fitting for horizontal stabilizer. Material: - - - 75ST aluminum allay. - One blade - 8" fly cutter. Cutter: - - -Cutter Speed: - - - 875 rpm. 9 ipm feed. Production: - 12 pieces per hour - all sides milled.

Investigate the versatile new CH line of milling machines. Their features are job proven to give you cost-cutting results plus greater productivity, better finished products. Contact our nearest representative or write: Kearney & Trecker Corp., 6784 W. National Avenue, Milwaukee 14, Wis.

CH MILLING MACHINE FEATURES - CUT COST PER PIECE

Greater cutting efficiency - design refinements in 3-bearing spindle, a heavy duty, special forged steel gear.





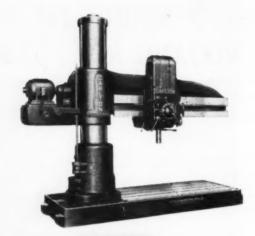
Smoother feed performence, heavy duty 2" dia. table feed screw. 23% more bearing contact between screw nut.

Speed range changes from 25 to rpm. Extrawide feed range-16 changes from 1/4 to 32 ipm.





Only one can be called "the finest

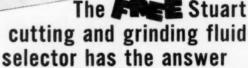


CARLTON is "the One"

Why? For many reasons: automatic positioning of arm, hardened wear strips, counterbalanced spring for compensating for heavier tools, built-in light in head, push-button control, precision power clamping of column, arm and head, automatic lubrication. These and the many other Carlton advantages explain Carlton's top performance. You're sure to find your most economical size here, too, because the Carlton line includes arm lengths from 3-ft. to 12-ft., column diameters from 9" to 26". Write today for descriptive literature. The Carlton Machine Tool Co., Cincinnati 25. Ohio.

Carlton radial drills





There is a right cutting fluid for every cutting and grinding job. For that reason Stuart has developed this FREE Cutting and Grinding Fluid Selector. It's a ready reference that recommends cutting and grinding fluids that field experience has shown to be most suitable under average job conditions.

Send for your Stuart Cutting and Grinding Selector today. It's your quick guide to starting recommendations that will help you get the right cutting fluid to achieve the best results.

Stuart's Cutting and Grinding Fluid Selector and Dilut-O-Graph Folder

This folder contains a Stuart Cutting and Grinding Fluid Selector and a Dilut-O-Graph . . . a circular slide rule that makes the diluting of cutting fluids quick and easy. For your free folder, fill out the coupon below.



More Than a "Coolant" is Needed

D.A. Stuart Oil co.

TIME-TESTED CUTTING FLUIDS AND LUBRICANTS 2749 S. Troy St., Chicago 23, III.

Canadian D. A. Stuart Oil Co., Ltd. 3575 Danforth Ave., Toronto

| D | 9 | s. | T | ro | y | : | St | ·, | il | | C | 0 | L | 10 | 1. | 3 | | 21 | 1. | | | | | | | |
|-------|-----|-----|-----|----|---|----|----|----|----|---|---|----|---|----|----------|---------|---|----|----|---|---|---|---|-----|---|----|
| Plec | FI | uic | e i | S | e | ti | cl | 0 | S | U | | ri | C | U | tt lu | ir t | 9 |) | 0 | ח | d | D | G | rii | n | d- |
| Nan | 10 | . , | . , | | | | | | | | | | | | | | | | | | | | | | | |
| Title | · · | | | | | | | | | | | | | * | | * | | | | | | | | | | |



COMPARE

... PRICE!... FEATURES!... PERFORMANCE!

GREAVES

... WILL BE YOUR CHOICE!

"The Most Mill For The Least Money"

Now you can make the same painstaking comparison that sold and satisfied leading plants on Greaves 2H plain and universal milling machines. A free chart cross-compares 22 significant specifications . . . including speeds, feeds, power and capacity . . . on each of the eight leading milling machines.

Make your own comparison . . . in your office, out on the factory floor or right out of our competitors' catalogs . . . we're convinced you'll find that Greaves is your best buy!

GREAVES MACHINE TOOL COMPANY 2600 EASTERN AVENUE, CINCINNATI 2, OHIO
Please send me the COMPARISON CHART.

WRITE FOR

COMPARISON

OF THIS EYE-OPENING



Ex-Cell-O Precision Spindles are the original equipment choice of leading grinder manufacturers. They are rigid, smooth-running. For high precision work they are fitted with standard Ex-Cell-O Precision Ball Bearings; for slower speeds and heavier cuts they are equipped with heavyduty Ex-Cell-O Precision Ball Bearings. Phone your Ex-Cell-O representative or write to Ex-Cell-O in Detroit for grinding spindle catalog.



May, 1954



ECONOMY



Another Name
For Precision—
Performance—Fit

- "TRU-LOC" ADJUSTABLE ADAPTER SLEEVES & NUTS
- A.S.A. DRILL JIG BUSHINGS
- A.G.D. PLUG & RING GAGES

Prompt service on deliveries is a certainty at "Economy," with all items regularly stocked.



1929 S. 68th St., Milwaukee 14, Wis.

save
up to
30%

cost
less
to own

Queen City

operate

grinders and buffers

So good they're guaranteed: "try one for 30 days... if you're not satisfied, return it." It makes cents... and dollars... to buy equipment like that at prices 20 to 30% under competing makes!

The complete range of Queen City Grinders and Buffers... floor and bench types... is described in newly-revised literature.

WRITE FOR FREE CATALOG TODAY!

QUEEN CITY MACHINE TOOL CO. 3912 Kellogg Avenue, Cincinnati 26, Ohio "High Quality—Low Cost—For over 50 Years"

SKF



RACES Against Time...

with the

GISHOLT NO. 24 HYDRAULIC AUTOMATIC LATHE

When it comes to fast production of top quality spherical roller bearing races, SKF doesn't fool.

These big Gisholt No. 24 Hydraulics remove 34 lbs. of metal in two operations in a total of only 2.80 minutes' machining time on each of two machines. All cutting is on 52100 bearing steel and done at speeds of 325 to 350 f.p.m.

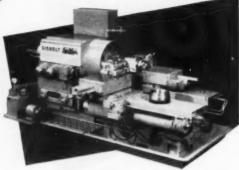
Speed is important, of course. But precision is the governing factor. How the Gisholt No. 24 does the job is a story that might mean real savings for you, too.

The No. 24 Hydraulic Automatic Lathe is a larger version of the famous No. 12 that has an outstanding success record on hundreds of jobs. If you have large volume precision work up to 24° diameter, the Gisholt No. 24 is the machine to investigate. Write for full information.

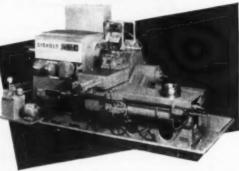


Madison 10, Wisconsin

THE GISHOLT ROUND TABLE represents the collective experience of specialists in machining, surface-fusioning and balancing of round and partly round parts. Your problems are welcomed here.



First Operation: Chucked on OD with 3-jaw hydraulic chuck, part is turned up to the jaws, faced, chamfered, bored and bore radius formed. Cam relief on tear tool block turns boring bit clear of workpiece as it is withdrawn.



Second Operation: Part held on expanding arbor by hydraulic pressure is finish turned, faced, chamfered and bore radius formed. Special rocker arm type carriage at rear tips in shaving tools to form both roller grooves with feed of .003" to .0045."



TURRET LATHES . AUTOMATIC LATHES SUPERFINISHERS . BALANCERS . SPECIAL MACHINES

BENRUS OBTAINS

"WATCHMAKER'S PRECISION" STAR

PRODUCTO Catalog DIE SETS

By converting a Producto 2-pin catalog die set into a special
4-pin set, the Benrus Watch Company, Waterbury, Conn.,
were able to carry on this precise link stamping job economically,
yet at no sacrifice of production speed or quality. The easily
made conversion gave Benrus a small, compact, carefully
balanced die set that lined up perfectly. The results, as indicated
below, assured high-quality, high-speed stamping with a minimum
of rejects and with extremely low per-hour and per-grind costs.

PART: "X-type" Expansion Bracelet.

STAMPINGS: Top and bottom links (or liner parts) supporting outer shells.

MATERIALS — TOP LINK: Type 430 steel, dead soft, bright finish.

BOTTOM LINK: 85-15 rich low brass, dead soft.

TOLERANCE: Hole Locations — Both top and bottom ± .0005".

THICKNESS: Top — .018". Bottom — .030".

STATIONS: Top — 3. Bottom — 10.

PRODUCTION: Top — 6,000 pieces per hour. 50,000 pieces per grind.

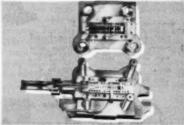
Bottom — 6,000 pieces per hour. 75,000 pieces per grind.

OPERATIONS: Top — Pierce, pilot, blank.
Bottom — 6 draws, pierce, swedge, pilot, blank.









For Precision Die Sets Fast Call ...

THE PRODUCTO MACHINE CO. 980 Housetonic Ave., Bridgeport 1, Conn.
ALSO MAKER'S OF TOOL AND DIEMAKERS ACCESSORIES, VISES, MACHINERY



17094

Get the Facts-Today! on STONE High-Speed CUTTING EQUIPMENT

If you do any metal cutting, ferrous or non-ferrous, in your plant, you should know all the benefits that Stone High-Speed Cutting Equipment can offer you. Faster cutting—cleaner cutting—lower cost cutting—with a minimum investment in equipment.

Models available for All Shop needs

MODEL M-35 .

Low priced model with all the features of Stone machines. Full $3\frac{1}{2}$ h.p. geared-in-head motor. Capacity is $1\frac{1}{2}$ " solids and $2\frac{1}{2}$ " pipe and structurals in ferrous metals. Non-ferrous $-2\frac{1}{2}$ " solids, 3" tubing and extrusions.





Operates on guided rails for cutting larger structural steel, plate, sheets, with cuts up to nine feet in length. Cuts wet or dry.



- MODEL M-75

Full $7\frac{1}{2}$ h.p. geared-in-head motor. Will cut all ferrous and non-ferrous solids up to $2\frac{1}{2}$ ", pipe and structurals up to 4". Can be equipped for wet cutting.

Get The Facts
— NOW!

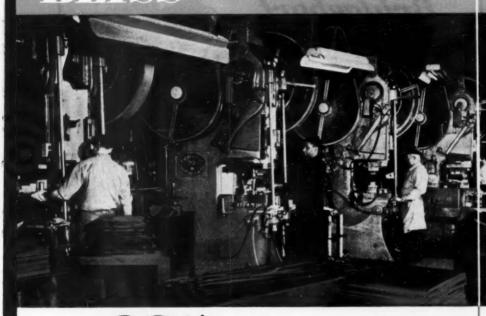
For complete information write to

STONE MACHINERY Co., INC.

404 Fayette St. Manlius, N. Y.

At Art Steel Company, too,

Presses Predominate



97% are Bliss-Built

Now, Art Steel Company, one of the leading manufacturers of steel office equipment—Steelmaster—credits Bliss with an important role in its progress. For Art Steel has looked to Bliss since 1923 for engineering counsel and the right press for each operation. Seventy-three Bliss presses making up 97% of Art Steel's press equipment attest to the fact that Bliss

Asked why the continued preference for Bliss presses, Art Steel officials sum it up in one word—"dependability".

And that's why hundreds of sheet metal plants throughout this country specify Bliss presses more than any others. Whether your requirements involve mechanical or hydraulic presses, it pays to call for a Bliss engineer. He can show you why Bliss belongs in your press room, too.

BLISS

has justified this confidence.

on your press is more than a name...it's a guarantee

E. W. BLISS COMPANY, Canton, Ohio PRESSES, ROLLING MILLS, SPECIAL MACHINERY

Subsidiery: The Die Supply Co., Cleveland, O. • E. W. Bliss (England) Ltd., Derby • E. W. Bliss Company (Parls) France U. S. Plants in Canton, Saism and Toledo, Ohio; and Hastings, Michigan; San Jose, Cal. Branch Offices in Chicago, Cleveland, Dayton, Detroit, Indianapolis, New York, Philadelphia, Rechester, Taledos and Taronto, Canada.

These 5 Features are

exclusive with

<u>Bridgebort</u>

The Turret Milling Machine that:

- 2. provides a means of milling, drilling, boring and shaping combined with ability to position the milling head at angles over a wide area . . without changing set up.
- 1. will handle a wide variety of work more economically and with greater accuracy... in tool room, die shop and in production.
- 3. . has versatility and all-round handling convenience to assure productivity over maximum available machine hours.
- 4... can be equipped with attachments specially designed for it and when so equipped offers an outstanding range of utility... hence the universal acceptance and phenomenal sales records of this machine.
- 5., is within the reach of shops large and small because it is moderately priced, making highest returns possible on a reasonable investment in a truly modern machine. Write us or your nearest dealer for further details, complete description and specifications.



An improved vise providing great gripping power. Streamlined for attractiveness; equipped with coelant trough. Large diameter serew assures rigid holding. Two sizes: 5"x3½" and 6"x5" jaw openings.



NO. 2 BORING HEAD

Boring Tools and Holder provide the means of boring holes up to 6" diameter. Available for use on Bridgeport i HP Milling. Driliing and Boring Attachment.



RIGHT ANGLE

(Left) Heavy Duty
... for milling and
drilling at right
angles. Fits both
Master and I HP
Bridgeport Heads.

(Right) Light Duty for right angle milling and drilling narrow, deep molds and cavities.



Bridgeport MACHINES, INC.

Manufacturers of High Speed Milling Attachments and Turret Milling Machines

when mistakes happen...



Automotive crankshaft being brought up to inspection standards with metallizing. This automotive manufacturer formerly used plating for this type of salvage, worked one per hour. With metallizing, the salvage operation requires only 5 to 10 minutes per shaft, including surface preparation.

Free Bulletin

Get the full story on metallizing in production salvage. Bulletin 57-C describes and illustrates the procedures, provides data on typical parts, with interesting photo-micrographs showing the unique bonding action of Sprabond Wire. Send for a copy.

METALLIZING ENGINEERING CO., INC.

38-14 30th Street LONG ISLAND CITY I N T

In Great Britain METALLIZING EQUIPMENT COMPANY LTD Chobham near Woking Englan

... and they do in any busy machine shop, there's no need to scrap a mis-machined or otherwise damaged machine part that represents an investment of many expensive man-hours.

Parts like these are brought up to inspection standards quickly, easily and inexpensively with metallizing.

And with the new molybdenum metallizing wire, Sprabond, the only surface preparation required is cleaning. The molybdenum forms a molecular bond with the surface being rebuilt. Little heat is generated, eliminating any danger of warpage.

What's more—users have found that the extreme hardness of the molybdenum coating, and its microscopic porosity which provides superior lubricating characteristics, improve its "wear-ability" over ordinary bearing surfaces as much as 25 times. You haven't just salvaged a part—you've improved it.

The trade name, SPRABOND WIRE, is the property of Metallizing Engineering Co., Inc.

| Don F | . Wat | son, Me | tallizin | g Eng. | , Co., | Inc. | |
|-------|-------|---------|----------|--------|--------|-------|---|
| 38-14 | 30th | Street, | Long | Island | City | 1. N. | Y |

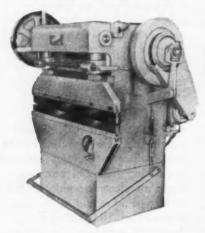
- Please send me Bulletin 57-C.
- Please have Metco Field Engineer call.

Name____

......

City_____State_





VERSATILE -ECONOMICAL

- Bending
- · Piercing
- · Forming
- Flanging

The new Connecticut Press Brake saves set-up time on short runs and production time on long runs. It's economical to own and operate,—frees heavy equipment from small jobs.

Built-in back gage and other quality features of more expensive machines.

Mail inquiry card opposite for full details, or write for field engineering service.

W. WHITNEY STUECK, INC.

I Conn. Ave. Old Saybrook, Conn.

Manufacturers of a Complete Line of Bending Brakes

MACHINE and TOOL BLUE BOOK

NEW ENGLAND and EASTERN N.Y. STATE

Dan E. Reardon Box No. 1 South Glastenbury, Conn. Telephone: MEdford 3-7083

NEW YORK METROPOLITAN AREA

Dan E. Reardon Martin J. Gallay c o Hitchcock Publishing Co. 55 W. 42nd Street New York 36, N. Y. Telephone: LAckawanna 4-4528

PENNSYLVANIA, NEW JERSEY, BROOK-LYN, N.Y., SOUTHERN N.Y. STATE, DELAWARE, MARYLAND

Raymand J. Sietsema c/o Hitchcock Publishing Co. 55 W. 42nd Street New York 36, N. Y. Office Telephone: LAckawanna 4-4528 Home Telephone: VErona (NJ) 8-3072J

WESTERN N.Y. STATE, WESTERN PENNA., N.E. OHIO

Ralph E. Helfrick 1507 Edgefield Rd. Cleveland 24, Ohio Telephone: Hillcrest 2-0189

OHIO, EASTERN MICHIGAN, INDIANA,

Henry J. Smith 3529 Radcliffe Rd. Cleveland 21, Ohio Telephone: EVergreen 2-2520

MIDDLE WEST, WESTERN MICHIGAN

James C. Stewart 222 E. Willow Ave., Wheaton, III. Telephone: WHeaton 8-3400

CALIFORNIA & ARIZONA

Keith H. Evans 3757 Wilshire Blvd. Los Angeles 5; Calif. Telephone: Dünkirk 8-2981 Room 304, 593 Market Street San Francisco 5, California Telephone: YUkon 2-4280

OREGON & WASHINGTON

Lloyd Thorpe 604 Medical Arts Building Seattle 1, Washington Telephone: MAin 6827

HITCHCOCK PUBLISHING CO. WHEATON, ILLINOIS Telephone: WH 8-3400

PRINT CLASS PERMIT NO. 172 SEC. SLA, P. L. 6 & WERRYON, ELLINOS

BUSINESS REPLY CARD 1

To POSTAGE WILL BE PAID BY

MACHINE and TOOL BLUE BOOK

WHEATON, ILLINOIS

PERSON NO. 572 SEC. SES. P. L. & P. WEERSON, ELITIONS

BUSINESS REPLY CARD

Se POSTAGE WILL BE PAID BY

MACHINE and TOOL BLUE BOOK

RÉADERS' SERVICE DIVISION

WHEATON, ILLINOIS

USE THESE Postage ACTION CARDS MAY

| Please se | nd informat | tion on the i | tems encircle | d. These r | numbers con | respond to th | wee which |
|----------------|--------------------|---|----------------------|--|----------------------|---|---|
| 1 2 | 3 / 4 | 5 6 7 25 26 27 | 8 9 10 | 11 12 | 13 14 15 | 16 17 1 | 19 20 |
| 41 42 | 43 44 4 | 15 46 47 | 48 49 50 | 51 52 | 53 54 55 | 36 57 5 | 3 59 60 |
| 61 62 81 82 | 63 64 6 83 84 8 | 65 66 67 65 86 87 | 68 69 78 | 71 72 91 92 | 73 74 75 93 94 95 | 76 77 78 | 3 79 80 8 99 100 |
| 101 102 | 103 104 10 | 05 106 107 1 | 08 109 110 | 111 112 1 | 13 114 115 | 116 117 11 | 8 119 120 |
| 141 142 | 143 144 14 | 25 126 127 1 45 146 147 1 | 48 149 150 | 151 152 1 | 53 154 155 | 156 157 15 | 3 139 140 3 159 160 |
| 161 162 | 163 164 14 | 65 166 167 1 | 68 169 170 Please | | | | |
| Company | | ************ | | | | ************************************** | |
| Name | | *********** | | | Pealtie | | |
| Street | | 450000 00000000000000000000000000000000 | | | | | |
| Cley | | ***************** | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | Section. | |
| | | | | | | | |
| | | etion on the | | or services | mentioned | or advertise | d on the |
| following | popul | *****nosopedo | 2 | ********** | ********** | | 69900044500 |
| 0-1000rea000 | 700000000000 | ********** | ********** | ******** | ********** | Bassessess | |
| Please of | | otion on NE | | 18 describe | d on the fe | allowing pag | co : |
| ********** | | ********** | | #00000pgabbs | | Possessional | |
| | | *********** | | | esan esta | 400000000000000000000000000000000000000 | 600000000000 |
| | ************ | | *********** | ********** | *********** | | ********** |
| | ***************** | | ********** | p.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,, | *********** | ********** | *************************************** |
| | MAC | HINE 8 | and T | OOL | BLUE | BOOK | |
| | | | ADERS' SER | | | | |
| | | | HEATON | | | | |
| | | POP PO | STAGE | | to La | A STATE OF THE STATE OF | MAY |

USE THESE POSTAGE ACTION CARDS MAY 1954



NOW Threadwell quality is protected in new plastic packages!

Threadwell Distributors are now receiving Threadwell taps in striking new lifetime plastic packages.

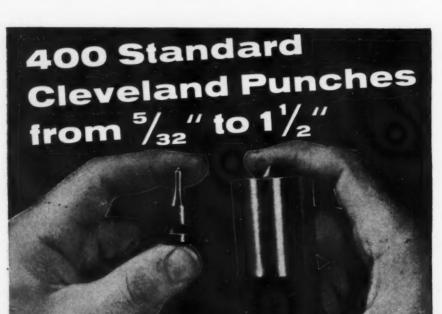
These packages will not only protect the fine quality of Threadwell taps but will also speed up delivery both to the Distributor and the user.

Threadwell is justly proud of the high quality of its products and this new package is one more evidence of our policy to produce the best possible product at the lowest possible price. Our only business is the manufacture of fine cutting tools. We intend to stick to our last . . . first.

Threadwell

distributor

THREADWELL TAP & DIE COMPANY . GREENFIELD, MASS.



YOUR orders for any of these 400 standard punches will be filled promptly from stock. Naturally they cost less than special punches. What's more, when you order Cleveland punches you're sure of getting quality tools backed by years of specialized experience. We're constantly experimenting with various steels and processes so that we can give you the very best.

Are your punching machines equipped to use standard Cleveland punches? If not, it will pay you to investigate the many advantages of standardization. For detailed information send for our new Catalog No. 12 today!



CLEVELAND PUNCH & SHEAR WORKS CO.

POWER PRESSES - FABRICATING TOOLS

City Foundry Division • Small Tool Department

E. 40th & St. Clair Avenue • Cleveland 14, Ohio

Established 1880

NEW YORK . CHICAGO . DETROIT . PHILADELPHIA . E. LANSING . OXFORD, O.

Simplify Repetitive Operations WITH

SOUTH BEND TURRETS

Repetitive operations requiring close tolerances can be efficiently done with these quality-built, accurate lathe turrets. There are 165 other attachments, tools and accessories for South Bend Lathes that will help you do better tooling at lower cost. Write for Attachment Bulletin 5321.



HANDLEVER BED TURRET

Mounts any place on bed. Indexes automatically ± .0005" at 4" from turret face. Hardened, ground and superfinished index pin. Automatic feed stop for each position. Effective slide feed 4". Tool holes \%" or \%". Two adjustable gibs on turret slide.

| Size Lathe | Catalog No. | Price |
|------------|-------------|--------|
| 9" | CL1611N | \$273. |
| Light Ten | CL1611K | 280. |
| 10" | CL1611R | 286. |
| 13" | CL1611T | 308. |
| | | |

All prices f.o.b. factory



HAND FEED TURNSTILE BED TURRET

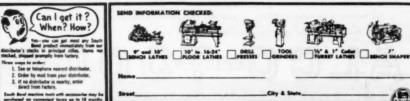
For 16" swing lothes. Indexes ±.0005" at 4". Superfinished index pin. Automatic indexing and feed stops. Slide feed 5½". Takes turret tools with 1½" diameter shank. Price \$683.



SQUARE TURRET TOOL BLOCK

for Compound Cross Slide Mounts 4 cutting tools, Turret indexes within .0005" to 4 positions. Quick acting lever lock. Rocker adjustments for tool height.

| Size Lathe | Catalog No. | Price |
|--------------|-------------|---------|
| 9" & 900 | CL3375N | \$46.00 |
| Light Ten | CL3375K | 48.50 |
| 10" & 1000 | CL3375R | 52.00 |
| 13" | CL3375T | 58.50 |
| 141/2" | CL3375F | 84.00 |
| 16" & 16-24" | CL3375H | 91.00 |



Building Better Tools Since 1906 - SOUTH BEND LATHE . South Bend 22, Indiana

cut your second operation costs...
with ALCO B&S MAGAZINE ATTACHMENT

Engineered for the job

Attach the Alco Magazine to any B&S automatic screw machine, with no extra drilling or fitting, and do second operation work semi-automatically.

The Alco Magazine consists of a complete set-up including the magazine for holding and carrying the work to the chuck, as well as coms, form tools, chuck with ejector, and inserting tool.

Parts requiring second operation usually keep one operator occupied exclusively on the turret lathe or drill press. With the Alco Magazine, one operator can handle additional automatics while keeping the chute in the magazine filled . . . a definite saving in man hours.

Send drawing of part for complete engineering data, price, and catalog.

ALC CFFD OLS

"A COMPLETE SCREW MACHINE SERVICE"

THE ALCO TOOL CO., 52 BIRDSEYE ST., BRIDGEPORT, CONN.

GEARS NOISY? ...Of Course

The Gear Business has always seemed to attract colorful and positive characters. Like George B. Grant, the Dean of Gear Makers in the Gay Nineties.

Sixty years ago he gave industry a few gems of philosophy in what he referred to as his Treatise on Gears.

For Instance:

NOISO: at a high speed is unavoidable. Fibre gears are quieter and softer than metal, and raw-hide is still quieter and less durable. Raw-hide and fibre are good at high speed, but unsuitable for heavy strains.

I Am Not Respon-

Sible for Any Mistake: even if I make it myself, it it could have been prevented by sending me working drawings or good sketches. If you make me guess, you must take the responsibility. A poor drawing is better than none.

Unless Otherwise

Described: every gear ordered is a cut spur gear of cast iron, and it will have such diameter, pitch, face, hole, hub, and quality as I happen to think most desirable. Describe what you want and that you will get, but if you omit any detail I may write to you for the information required or I may guess at it and go ahead.

the parts to be fitted. I ream a hole with a one inch reamer, for example, but do not guarantee that it will fit your one inch shaft.

GEAR CUTTING

CLEVELAND EAR WORKS

--

Estimates: As a rule nothing is saved by getting an estimate. A low price means a cheap piece of work, here or elsewhere.

full of blow holes, and it taxes a long time to get them. A cast iron gear of wider face is as strong and cheaper.

If Mr. Grant could only have run a sound test on RED RING Shaved Gears.

4824



NATIONAL BROACH & MACHINE CO.

5600 ST. JEAN BETROIT IS, MICHIGAN

WORLD'S LARGEST PRODUCER OF GEAR SHAVING EQUIPMENT



Used in conjunction with a conventional carburizing-heat treatment cycle, Sub-Zero treatment at this noted manufacturing plant showed three-fold advantages. Formerly, in the production of precision parts, distortion showed up after finish grinding, necessitating several grinding operations. Now, Sub-Zero has eliminated the cause of distortion . . . a single grinding operation is all that is required and

production has increased.

In another department, purchased tools are routinely Sub-Zero treated to increase service life. A certain tap, for example, formerly was good for 5 to 20 holes; now it produces up to 250 holes . . . over 1000% added life! A new catalog gives complete technical data on Sub-Zero metal treatment . . . shows how you, too, can save. Write for your copy today!

CINCINNATI SUB-ZERO PRODUCTS

3930-P4 Reading Road Cincinnati 29, Ohio

PORTER-CABLE

ABRASIVE-BELT MACHINES

(Now Made and Sold by Engelberg)

Do More Surfacing Jobs FASTER and BETTER

Features high speed cutting by millions of abrasive points imbedded in a continuous belt, cooled and cleaned by water and other coolants. Does close tolerance work on flats, squaring, cylindrical surfacing; deburrs, knocks off corners, forms radii, bevels and other operations. Often does milling, shaping, grinding operations 10 times faster—saves 75-90% set-up time.



PLATEN OR FREE BELT

Model B-6W. Quickly adaptable to flat, curved or irregular pieces. Various shaped platens form the flexible abrasive belt to fit many shapes of work. Free belt reaches inaccessible spots.



CONTOUR GRINDER

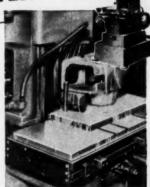
Model C-6. For curved or flat-face grinding or polishing. Flexible abrasive belt runs over shaped contact roll. Loaded abrasive wheel no longer necessary. Wide-range adjustments easy for varied work. Saves aet-up time and reworking of piece.



FINAL FINISH

Model WG-4. For production runs on small parts, fed freehand or by simplest fixtures. Gives final finish to jobs done on automatics, hand and hacksaws, lathes, milling machines, etc. Grinds carbide tipped tools.





BG8/FT9 Grinds Casting 100% Faster: No Distortion

Problem: Machine two rim surfaces of aluminum oil burner casting with single set-up.

Solution: Model BG8/FT9 with indexing fixture.

Both sides are ground without moving the piece.

Net grinding time for two surfaces: 15 seconds.

This was 100% faster than former milling time.

In spite of rapid stock removal there was no distortion.

. FREE SAMPLE GRINDING

We will prove Abrasive-Belt Machining can cut your costs. Send samples for recommendations and actual test grinding. No obligation.

| The ENGELBERG Huller Co., Inc. 805 W. Feyette St., Syrocuse, N. Y. | DHIER TABLE |
|---|--|
| Send case history booklet and name of nearest distributor. | |
| Nems | W-MUI-M-II-M-II-M-II-M-II-M-II-M-II-M-II |
| Tiele | |
| Company | |
| Address | |
| City | State |
| | |

in portable nibblers

YOUR BEST BUY IS BUCKEYE

Buckeye portable air-powered nibblers eat their way through 18-gauge sheet metal, leaving a clean, sharp cut with no distortion of the exposed edges. They cut a radius as small as one inch, follow the most intricate contours swiftly and exactly. When working on panels already assembled in position, cutting can be started anywhere an access hole is provided for the nibbler. Extra-long throat model permits cutting in hard-to-reach areas.

All Buckeye nibblers have hardened and ground punch and anvil, easily accessible for re-grinding and replacement, if necessary. If you cut sheet metal up to 18-gauge, a Buckeye nibbler can become one of the busiest tools in your plant!





AIR TOOLS CATALOG

Write for your copy of our Air Tools Catalog. Trial test of any Buckeye tool, in your own plant, can be arranged without obligation.

Duckeye Tools
CORPORATION 1, OHIO

producers of the world's first successful rotary air tools





SLIDE FEEDS
ROLL FEEDS
STRAIGHTENERS
STOCK REELS
COIL CRADLES
OILERS — WIPERS
SCRAP CHOPPERS
MULTI-STOP
U.S. MULTI-SLIDES
U.S. MULTI-MILLERS

You can obtain all the advantages of automatic operation in your press room with U.S. Equipment. U.S. Slide Feeds, Stock Reels, Straighteners, Coil Cradles, Scrap Choppers, etc. are designed and built to provide increased efficiency, greater production, material savings and reduced labor costs in the fabrication of stampings. The photograph—courtesy of Whirlpool Corp., manufacturers of home laundry equipment—illustrates a set-up of U.S. Automatic Press Room Equipment in use at their plant.

U.S. Slide Feeds are recognized as the most accurate automatic feeds in the market. They can pull material, within their capacity, through a plain stock straightener and still maintain controlled accuracy. Bulletin No. 80-B contains complete specifications. Write for your copy.

U.S. TOO

COMPANY, inc.

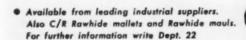
MPPRP-(Book-Grangel-MEW-180529

D JAW-HEAD



The best "soft" hammer your money can buy!

Tough, resilient water buffalo faces deliver plenty of power with full protection for delicate parts and finishes. Faces are easily replaced, and comfortable Safety-Flare handle gives you non-slip grip. Work goes better with a C/R RAWHIDE Jaw-Head. See for yourself.





CHANGE FACES IN SECONDS

CHICAGO Kawhide MFG.CO.

1301 Elston Ave. Chicago 22, Illinois

In Conada Super Oil Seal Mfg. Co. Ital Hamilton, Ontario

for more Accurate cuts...
greater Rigidity in

BORING TOOLS

> BORING HEAD BORING BAR

Use CRITERION BORING EQUIPMEN

BORING PROBLEMS? CLOSE TOLERANCE?

Try Criterion Boring Tool. Built with the same care quality as the time-tested Criterion Boring Head.

THIS COMBINATION WILL PRODUCE RESULT

Boring heads from 1½ to 7 Inch diameter. Boring to carbide or high speed steel, % to 1% Inches diameter. B holes from % to 20 inch diameter.

Accuracy for the closest talerance • Rigidity for the he cuts • Heat-treated parts for long wear

LARGE OFFSET SAVES TIME AND TOOL CHANGES

CRITERION MACHINE WORKS These tools will cut your boring costs.

See the complete line of CRITERION TOOL PRODUCTS of local dealers or write for the scholage.

9312 SANTA MONICA BLVD . BEVERLY HILLS, CALL



Manhattan Portable Wheels More Use Per Dollar

MORE OUTPUT PER MAN-HOUR. . . You can step up snagging at your plant by selecting a Manhattan Portable Wheel. Abrasive, structure, grain size, bond . . . every feature of the wheel is engineered to meet your specific requirements . . . to remove more metal, faster . . . at lower cost. The result — more pieces done . . . plus uniform quality production and longer wheel life.

This individual engineering for your particular job means "More Use per Dollar" when you specify "Manhattan" for your portable grinders. Let one of our experienced representatives show you how you can get more output



WRITE TO ABRASIVE WHEEL DEPARTMENT

RM 434-R

MANHATTAN RUBBER DIVISION - PASSAIC, NEW JERSEY

per man-hour and lower production costs at your plant . . . with Manhattan Portable and other types of high speed, heavy duty wheels.

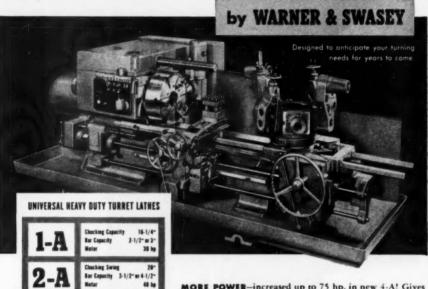


RAYBESTOS-MANHATTAN, INC.

Manufacturers of Mechanical Rubber Products * Rubber Covered Equipment * Radiator Hose Fan Belts * Brake Linings & Blacks * Clutch Facings * Packings * Asbestos Textiles Engineered Plastic, and Sintered Metal Products * Abrasive & Diamond Wheels * Bowling Balls

COMPLETELY NEW!

A whole new line of saddle type turret lathes...



WARNER & SWASEY Cleveland PRECISION MACHINERY SINCE 1880

ching Swing

Bar Canacity

23-1/2"

60 hp

28-1/4"

8" ar 12"

75 kg

4.1/2" at \$1

MORE POWER-increased up to 75 hp. in new 4-A! Gives you more than enough power for any job-faster removal of metal at all speeds!

MORE SPEEDS—16 speeds with smaller increments provide ideal speeds for more work diameters, increased production and tool life! 32 un-duplicated speeds with 2-speed motor!

AUTOMATIC SPEED CHANGES—automatic hydraulic gear shifting in a matter of seconds on 2-A, 3-A and 4-A—boosts production, cuts operator fatigue! New 1-A's constant-mesh gear train with hydraulic clutches eliminates gear shifting completely!

SIMPLIFIED ZONE CONTROLS—eliminate waste motion and facilitate machine handling—increase operator efficiency! Single master control lever controls gear shifting, spindle stops, starts, and reverses!

IMPROVED ATTACHMENTS — Hydraulic chuck and bar feed with power return—for easier handling, less operator fatigue! New power chuck wrench eliminates backbreaking effort when chucking. Does not obstruct spindle bore!

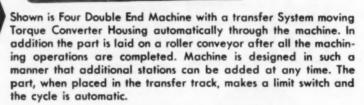
RETAINS STANDARD WARNER & SWASEY TOOLING all existing saddle type tools of the world's largest and most complete line can be used on these new turrer lathes.

YOU CAN PRODUCE IT DETTER, FASTER, FOR LESS WITH WAZNER & SWASEY MACHINE TOOLS, TEXTILE WACHINERY, CONSTRUCTION MACHINERY



for

Drilling, Chamfering, Boring and Tapping



WE SOLICIT YOUR INQUIRY AS TO ANY SPECIAL DRILLING, MILLING OR BORING OPERATIONS YOU MAY HAVE



ICHIGAN DRILL HEAD CO.

971 E. EIGHT-MILE ROAD

HAZEL PARK, MICH.



on AIR and HYDRAULIC POWER!

Hydraulic Cylinder Cetalog 106 — Cushioned and non-cushioned, standard rod and 2:1 rod, single and double end rod, internal and external threads, all standard mountings in 2" to 10" bores. Offered for 1500 P.S.I., 3000 P.S.I.

RIVEL



Hydraulic Valve Catalog 204—4-way, 3-way, pilot, and remote volves in 6 operations, 4 actions, 7 sizes, 5 piston designs. Offered for 1500 P.S.I., 3000 P.S.I. These five books, totaling 68 pages, are jam-packed with all the data necessary to lay out successful air and hydraulic circuits. 450 Rivett models, in a variety of sizes, are detailed—every standard air and hydraulic component offered in the industry. Description of each includes working drawings, specifications, and cut-away views. Easy to use, complete in information, these Rivett catalogs are a must on every board. Write to Rivett Lathe & Grinder, Inc., Brighton 35, Boston, Massachusetts.

450 standard Rivett models described!

- All the necessary components for any efficient circuit.

Hydraulic Power Unit Catalog 400 — Single, double and combination pump types. Single — .4 G.P.M. to 40 G. P. M. at 1000 P.S.I. Double — 3.5 G.P.M. to 40 G.P.M. at 1000 P.S.I.



State

Air Cylinder Catalog 55—Cushioned and non-cushioned, single and double end rods, internal and external threads, 7 mountings in 1½" to 12" bores. Offered for 150 P.S.I. air and 300 P.S.I. air and 300 P.S.I. air services.

Rivett Lathe & Grinder, Ins., Dept. MTB- Brighton 35, Boston, Mass. Please send me: Hydraulic Cylinder Catalog 106 Hydraulic Valve Catalog 204 Hydraulic Power Unit Catalog 400 Air Cylinder Catalog 55 Air Valve Catalog 303

Name Company

City

Air Valves

Air Valve Catalog 303—4-way and 3way, pilot and remote valves in 5 operations, 5 sizes. Offered for 150 P.S.I. service.



furnishes a complete power package

VALVES . CYLINDERS . POWER UNITS

OUTSTANDING VALUES BY AMERICA'S LARGEST BUILDERS OF DIVIDING HEADS

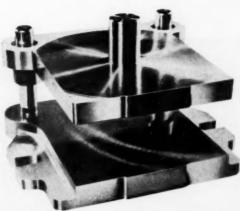


Heavy duty headstock and tailstock designed for maximum rigidity. Alloy steel threaded headstock spindle with extra large tapered bearing and takeup adjustment collar. Head tilts to 90° in vertical position. Alloy stress-proof steel worm and accurately cut worm wheel cut to close limits for accuracy. Ball bearing thrust and adjustable for end play. Complete with three index plates for dividing all numbers to 50 and even numbers to 100, except 96T. Index chart shows all divisions obtainable to 380. Right or left hand models. Ship. Wt. 36 lbs.



Order from your industrial supply distributor or order direct, giving name of your distributor. IMMEDIATE DELIVERY.





DANLY'S IN THE PICTURE

at Eastman Kodak Company

Danly Die Sets play an important role in the manufacture of Eastman's popular new Brownie movie camera and Brownie movie projectors . . . latest in the Eastman line that Danly Die Sets have helped build all through the years. Used to mount high precision dies, Danly Die Sets help bring "master die" accuracy to every finished part. But Danly Die Sets do more . . . even before a press run ever starts. They make tooling-up easier, faster—save you many, many hours in the die shop. And remember, Danly Die Set service is as quick and convenient as a phone call.

DANLY MACHINE SPECIALTIES, INC. 2100 South Laramie Avenue, Chicago 50, Illinois



PICK THE DANLY BRANCH NEAREST YOU!

CHICAGO 50 2100 S. Laramie Avenue CLEVELAND 14 1550 East 33rd Street DATTON 7 3196 Delphos Avenue DETROIT 16 1549 Temple Avenue GRANC RAPIDS 113 Michigan Street, N.W. INDIANAPOLIS 4 5 West 10th Street LONG ISLAND CITY 47.28 37th Street "LOS ANGELES 54__ Ducommun Metals & Supply Co., 4890 South Alameda MILWAUKEE 2 111 E. Wisconsin Avenue PHILADELPHIA 40 511 W. Courtland Street BOCHESTER 6_ 33 Rutter Street

*Indicates complete stock.



one of the most precise, universal machines available today. The four models shown, fill most basic requirements - whether for single parts with simple set-up, or multiple operations on mass production jobs with talerances to "tenths". Their versatility makes possible such operations as facing, boring, recessing, turning, slotting, key seating and contour milling, as well as regular milling. According to requirements, screw or lever longitudinal and transverse table feeds are available optionally. "The miller that uses its head" is your best choice - and one of industry's greatest values. If you want PRODUCTION MODEL production to "tenths", investigate the Nichols Miller.



SEMI-AUTOMATIC MODEL

"the miller that uses its head!"

Write today for the Michols general catalog, which describes the six medels of Michols Millers. A sound, color movie "the Miller that Uses its Head" is available for free showing. May we reserve it for you?



CONDENSED SPECIFICATIONS

Toble Working Surface 6½" x 21" or 30" Langitudinal Travel (screw or lever) 10" or 19" Transverse Travel (screw or lever) 7"

Vertical Travel — Knee 13½"

Bise and fall of Spindle 4½"

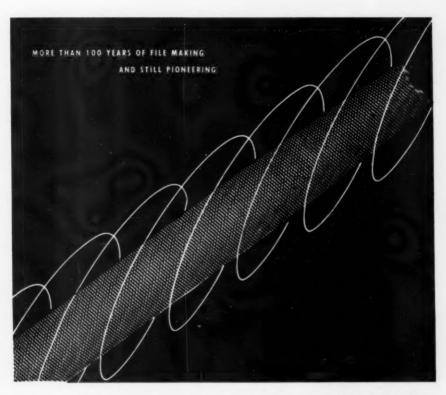
Selective Speed Ranges up to 5000 R.P.M.

Weight 1250 lbs.

MANUFACTURED BY W. H. NICHOLS COMPANY WALTHAM, MASSACHUSETTS

NATIONAL DISTRIBUTORS NICHOLS-MORRIS CORPORATION

76-G Mamaroneck Ave. White Plains, N.Y.



HELLER WAS FIRST WITH SPIRAL-CUT HALF ROUND FILES

Ordinary half round files require a skillful twisting of the file to produce smooth, even work. Heller engineering has removed this human element from good file performance with exclusive Spiral-Cut Half Round Files. The necessary "rolling action" is designed right into the file. This new cutting principle is typical of Heller's continuous search for better files. By constantly testing, inspecting, improving . . . Heller guarantees file users "the best."

other Heller First
NUCUT* Wary-Touth Files
VIXEN Milled Curved Toeth Files
WAVY-TEETH* Double Cut Mill and Saw Files

Registered T.M



See us at Booth 2121, ASTE SHOW.

THESE 3 FAMOUS BRANDS ARE MADE ONLY BY

HELLER BROTHERS CO. America's Oldest File Manufacturer NEWCOMERSTOWN, OHIO

SINCE 18 TO

YOUR HELLER DISTRIBUTOR CAN SUPPLY ALL YOUR FILE NEEDS



DPS BARREL-FEEDER

Here is an interesting case showing

separate screws and lock washers that were loaded into a single feeder and ejected loosely assembled at the rate of 60 to 70 a minute . . . An amazing speed increase over slow, manial operation. In this instance, as in

thousands of other applications, the unit was designed with the idea of maximum feeding of a wide variety of parts at a fraction of the cost of manual feeding.

DPS BOWL-

circular spiral, aligning and correctly locating them to issue directly into the work area in proper time cycle. Provides fully automatic feeding of light, fragile parts that normally could not withstand tumbling.

Let us diagnose your symptons and prescribe the proper remedy.

Write for details.



DETROIT POWER SCREWDRIVER CO.

An electric, vibrating unit

2809 W. FORT ST.

DETROIT 16, MICHIGAN

B

MACHINE and TOOL BLUE BOOK

NEW!

THE
MODERN
TYPE M
STUD SETTER*

A Better Stud Setter for Better Stud Setting!

*Details on Request

MODERN TOOL WORKS

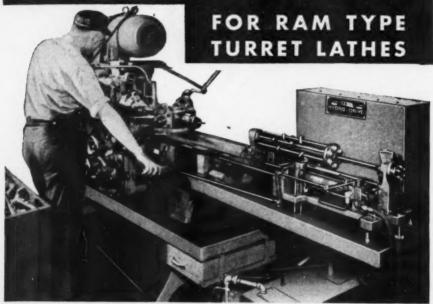
DINISION

CONSOLIDATED MACHINE TOOL CORPORATION

WHOLLY OWNED SUBSIDIARY OF FARREL-BIRMINGHAM COMPANY, INCORPORATED

ROCHESTER, NEW YORK

LYNN HYDRAULIC DRIVE





MINIMUM DROP IN PRODUCTION 20% MINIMUM DROP IN PRODUCTION COSTS IS GUARANTEED ON ALL JOBS WITH THE LYNN HYDRAULIC DRIVE.

Other Industry-Proved Products produced by LYNN:

> Conversion Turrets Self-Indexing **Tool Posts** Slide Tools

High Production-Low Costs

every installation of the Lynn Hydraulic Drive for Ram Type Turret Lathes saves a minimum of 20% in production costs. In many installations, the saving is over 40%. We guarantee 20%. Every installation is made by our engineers. They train local operators. With this drive almost anyone can do precision work with at least a 20% saving. A demonstration does not obligate you.

Write, call, or wire for descriptive literature and demonstration. MANUFACTURED BY Phone SOLD EXCLUSIVELY BY LYNN MFG. CO. ATlantic 7267 LINCOLN INDUSTRIES MINNEAPOLIS, MINN. -1123 SOUTH SEVENTH ST. - MINNEAPOLIS 4, MINN.

QUICK CHANGE

AND

"WILLE-GRIP" KEYLESS DRILL CHUCK

Tested for Performance to High American Standards Immediate Delivery from New York Stock

MADE IN GERMANY

Low Competitive Prices

All parts hardened and ground.
Simplicity of construction
insures trouble-free operation.
Gripping power of non-slipping
"Wille-Grip" chuck automatically
adjusts to load requirements.

"WILLE-GRIP" KEYLESS DRILL CHUCK



or headquarters New York City

Write for complete details and prices to Dept. 23.

M.B.I. EXPORT & IMPORT LTD. 475 Grand Concourse, Bronx 51, N.Y.

Over 20 years experience in designing & building machinery

CABLE ADDRESS Machbeild New York

QUICK CHANGE CHUCK



COLLET

- Multi Purpose Vises
- Tapping Attachments
- Milling Machine Arbors, Adapters, Arbor Spacers & Bearings
- Lathe Mandrels

DISTRIBUTOR INQUIRIES

(Some exclusive territories available.)

Also United States
Distributors of European
Machine Tools





CHROME PLATED

HARD

PISTON RODS
Prevent Scratch-Damage,

Nicks and Rust

P- AIR CYLINDERS

Complete "Custom-Built"

Miller "Custom-Built" Air Cylinders are available on normal scheduled delivery in thousands of combinations of bore, stroke and mounting style to meet every publ, pull, lift, clamping or pressing need.

Bore range is 1½" to 20". Any desired stroke. 13 standard mountings. Single and double rod end, single and double acting, spring return, cushioned and non-cushioned, oversized-rod and water-fitted cylinders are included.

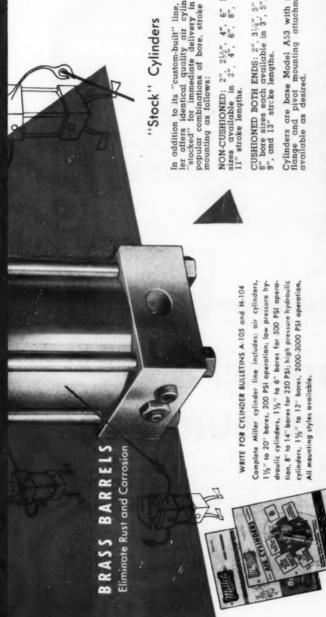
Protect Rods, Seals, Bushings

DIRT WIPER SEALS

Miller Air Cylinders are renowned for longest life with near-zero maintenance in heavy duty service. They feature the SPACE-SAVING SQUARE DESIGN originated by Miller in 1945 and fully met the J. L. C. Pneumatic Standards vears before their adoption in 1950.

SOLID STEEL HEADS, CAPS and MOUNTINGS

Fliminate Breakaae



I minimolità sidatel deleta

ler offers identical quality air cylinders "stocked" for immediate delivery in 200 for immediate delivery in 200 popular combinations of bore, stroke and In addition to its "custom-built" line, Mil-

CUSHIONED BOTH ENDS: 2", 31/4", 5" and 8" bore sizes each available in 3", 5", 7", 9", and 13" strcke lengths.

Cylinders are base Model A53 with foot. flange and pivot mounting attachments available as desired.

SALES AND SERVICE FROM COAST TO COAST

CLEVELAND • YOUNGSTOWN • DAYTON • PITTSBUBGH • PHILADELPHIA •
BOSTON • NARTYOND • NEW YORK CITV • BUFFALO • ST NAUL • GRAND
BENDS • DETROIT • FILINT • FORT WAYNE • SOUTH BEND • INDIANAPOLIS
• MILWARDEE • LOUISVILLE • KANASA CITV • SEATIE • LOS ANGELES •
MILWARDERS, • BAITIMORE • DENVER • ST. LOUIS • MOLINE • CHICAGO
• MOUSTOM • TORONTO, CANADA and OTHER AREAS

(Formerly MILLER MOTOR COMPANY)

2026 N. Hawthorne Ave., Melrose Park, III.

ACCURIUNATORS COUNTERBALANCE CYLINDERS AIR & HYDRAULIC CYLINDERS . . ROOSTERS



150 sq. in. 200 of WORK SURFACE

ABRASIVE NO. 1½ TOOLROOM SURFACE GRINDER—a quality-built hand feed grinder—has the capacity your toolmakers need for their work—nearly 50% more than most small surface grinders. Abrasive No. 1½ is easy to work with—it's a big favorite with toolmakers throughout the

world. Thousands of these simple, efficient grinders are in service today—in tool and die shops, and in the tool departments of production plants. Send for Catalog giving complete details. Abrasive Machine Tool Company 14 Dunellen Road, East Providence 14, R. I.



INCREASES
PRODUCTION.

LOWERS COSTS...

PAYS FOR ITSELF
QUICKLY...

The ROUSE HAND MILLER is a widely used, inexpensive, high speed, ball bearing, motor driven mochine for handling light cuts in bross, aluminum, steel, plastics, and other materials—fast, accurately, and at very low cast. Only \$110.000 Fixtures (illustrated) extra.

Motor equipment:—//AH.P. 110 Volt AC 60 cycle, single phoses, swivel motor mount

★ MILLS SMALL PARTS MUCH FASTER.

*All prices FOB Chicago.

- → DRASTICALLY CUTS YOUR INVESTMENT IN EQUIPMENT. Replaces expensive production machinery—or releases it for other jobs.
- ★ INEXPERIENCED HELP CAN OPERATE IT. Safe, simple, fool-proof operation.
- NO MORE COSTLY SET-UP TIME. \$110.00* price so low that it pays to keep one or more Hand Millers always set-up for special operations.
- ★ YOU GET A BETTER PRODUCT—the result of ABSOLUTE ACCURACY.
- A LOSS BECOMES A PROFIT when marginal pieces are finished on the Hand Miller instead of on high cost equipment.
- * VERY LOW MAINTENANCE.
- ★ USED REGULARLY IN 1163 MANUFACTURING PLANTS (some of which use as many as 30 machines)—yet on the market a scant few years.
- ★ UNIQUE VERSATILE. Nothing else like it. One or several machines can be the answer to some of <u>your</u> production problems.

Write today for further information. H. B. ROUSE & COMPANY

2214 N. WAYNE AVE. CHICAGO 14

50 YEARS OF SERVICE TO INDUSTRY



Can this simple check

HELP YOU REDUCE MACHINING COSTS?



The smoother the finish, the higher the machine cost—yet in many plants parts are overfinished because of the lack of proper gaging equipment. For example, if a surface roughness of 125 microinches is specified, and you are finishing to 32 microinches, your machining costs may be as much as twice that actually required for the job.

This expensive overfinishing can be eliminated with the new Brush SURFINDICATOR. It is a practical shop instrument that permits fast accurate measurement of surface roughness on the production line. It is simple to operate, portable, and can save its cost a hundred times over.

Write now for the booklet "Surface Finish Control." which explains how proper surface control can reduce machining costs, increase plant capacity, and improve product performance. Brush Electronics Company, Dept. I-5, 3405 Perkins Avenue, Cleveland 14, Ohio.

BRUSH ELECTRONICS

INDUSTRIAL AND RESEARCH INSTRUMENTS
PIEZO-ELECTRIC MATERIALS - ACOUSTIC DEVICES
MAGNETIC RECORDING EQUIPMENT
BUTTERSORE EQUIPMENT



COMPANY

formally

The Break Threshold Com

he Brush Development Ca. rush Electronics Company is an operating unit of Classia Corporation.

The SURFINDICATOR weighs only 15 pounds, can be set up anywhere in the plant where 115 volts a.c. is available

*Trade Mark

Here's How SCHRADER makes Compressed Air...

CONVENIENT!

With Schrader Ouick-Acting Couplers in airlines along walls, benches, columns-compressed air is "plugged-in" as readily as electricity. To connect-simply push adapter into check unit . . , to disconnect, manually turn sleeve of check unit. Available in many sizes.

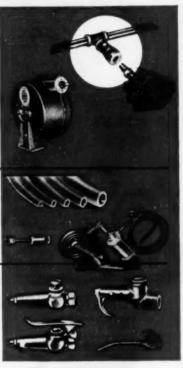
Keep idle air hose out of the way with a Schrader "Tuck-Away" Hose Reel-yet have it available at all times. Schrader Hose Reels come in several sizes with up to 50' of air hose.

RELIABLE!

With Schrader Hose, Fittings and Ferrule Machines, you're sure of neat, attractive air circuits that will have long, useful lives. You can meet your air needs with Schrader Air Hose and Fittings.

ECONOMICAL!

Whether your air line ends in rugged, practical Blow Guns like these - or Valves, Cylinders, Ejection Sets, Press Controls - you'll find there's a complete Schrader Line from which you can select the exact product to give you the maximum return on your compressed air investment.



REMEMBER - from air line to air tool - Schrader is one reliable source for all air control. products. For further information fill out the coupon below.

REG. U. S. PAT. OFF

products

Mail This Coupon Today

control the air

Air Cylinders • Operating Valves • Press & Shear Con-trols • Air Ejection Sets • Blow Guns . Air Line Cou-plers . Air Hose & Fittings . Hose Reels . Pressure Regulators & Oilers . Air Strainers · Hydraulic Gauges · Uniflare **Tube Fittings**

| | HRADER | | | cturina Co | mpany, Incorporate | d |
|------|--------|-------|--------|------------|------------------------------------|---|
| | andert | ilt A | renue, | Brooklyn | 38, N. Y., Dept. of Bulletin A280. | |
| Name | | | | | Title | |

Company_ Address

Zone_



AUTOMATIC THREADING MACHINES





"THREADMASTER" — Thread Milling Machine
... for precision, long and short
traversing, elevating, cross feed and lead
screws ... AUTOMATICALLY!

Speed up your production with one of the 3 COULTER Automatic Threading Machines for faster, better, and lower production cost parts. Insure yourself with the greatest margin of profits, yet produce parts with uncanny precision, perfect threading and have wide range versatility. Now you can be far ahead of all your delivery schedules. You can thread parts to desired lengths and diameters, use the metals your specifications require, and get a quality product on COULTER'S amazing threading machines. Everything is automatic.

Without obligation, consult our engineering staff with your specific threading problems. Catalog and machine specifications available upon request.

MACHINE TOOL BUILDERS SINCE 1896

The Coulter Machine Co.

643 Railroad Ave.

Bridgeport 5, Cenn.



... IF YOU HAVEN'T BEEN GIVEN "THE FACTS" ON SPEED STEEL PLATES

they are

SPEED CASE

a low carbon free machining open hearth steel

SPEED TREAT

a medium carbon free machining open hearth steel

SPEED ALLOY

a chromium alloy steel

THERE ARE SPEED STEEL SPECIALISTS IN ...

- Baltimore, Md..... Horace T. Potts Co. Bridgeport, Conn..... Bridgeport Steel Co.
 - Buffalo, N. Y. Beals, McCarthy & Rogers Cambridge (Boston), Mass..... Brown Wales Co. Chicago, III. W. J. Holliday & Co., Inc.
- Dallas, Tex..... Earle M. Jorgensen Co. Detroit, Mich..... Peninsular Steel Co.
- Hammond, Ind. W. J. Holliday & Co., Inc. Hartford, Conn..... Brown Wales Co.
- Earle M. Jorgensen Co. Houston, Tex.... W. J. Holliday & Co., Inc. Indianapolis, Ind.
- Lewistown, Me... Brown Wales Co. Los Angeles, Calif..... Earle M. Jorgensen Co.
- Memphis, Tenn.... Pidgeon-Thomas Iron Co. Montreal, Quebec Peckover's, Ltd.
- Newark (New York), N.J. Grammer, Dempsey & Hudson, Inc. Oakland (San Francisco), Calif. Earle M. Jorgensen Co.
- Paterson, N. J. Passaic County Steel Service, Inc.
- Philadelphia, Pa. Horace T. Potts Co.
- Toronto, Ontario Earle M. Jorgensen Co. Tulsa, Okla..... ☐ York, Pa..... Horace T. Potts Co.
- Peckover's, Ltd.

briefly they

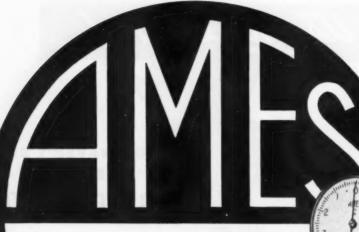
- are easy to heat-treat
- are fast machining
- give longer tool life
- produce better finishes

For fast information attach this to your company letterhead and return to

W. J. Holliday & Co., Inc.

545 WEST McCARTY STREET . INDIANAPOLIS, IND.

Speed steels are produced by W. J. Holliday & Co., Inc., Speed Steel Plate Division



...the Preferred Small Hole Gauge No. 36

Skilled and unskilled employees can use this superbly designed two-point contact gauge to make quick, accurate, impersonal inspections of small holes for size, taper and roundness.

The spherical contact point automatically centers itself and indicates the true diameter at the point measured.

The Ames Small Hole Gauge No. 36 checks holes with 3/16" to 1" diameter, up to 2" deep. Longer lengths and special contacts to check irregular recesses, splines, available.



Ames No. 15

Ames No. 25 Pocket Thickness Measure

Jaw Gauge



Ames No. 13 Dial Comparator



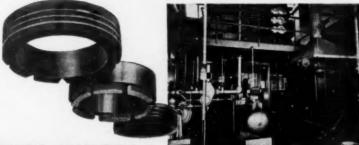
Ames No. 516 Dial Micrometer





Representatives in B. C. AMES CO. 28 Ames Street pripapal cities. B. C. AMES Migr. Of Micrometer Dial Gauges Micrometer Dial Indicators

From the NEW Blanchard Wheel Shop



VITRIFIED WHEELS

For more than 25 years, Blanchard has directed its efforts toward developing the best grinding wheels for Blanchard Surface Grinders. It began by pioneering with silicate bonded wheels, and then resin bonded wheels. Now, from a new, ultra modern Blanchard wheel shop come vitrified wheels... scientifically batched, pressed and fired... with positive control of time and temperature.

Today, Blanchard offers complete wheel service...silicate, resin and vitrified!

Use Blanchard wheels on your Blanchard Surface Grinder. They do a better job in less time, with less trouble and cost...whether your work is tough as copper or fragile as glass...whether it requires heavy roughing cuts or clean-up cuts with flatness to .000005" and finish of 1 micro-inch.

for Better Blanchard Grinding



THE BLANCHARD MACHINE CO. 64 STATE ST., CAMBRIDGE 39, MASS., U. S. A.





Please send free copy of Blanchard Wheel
Bookiet and Wheel Holder Folder.
BB

NAME.....

COMPANY____

STREET

ITY____STATE__





Tannewitz HIGH SPEED BAND SAWS

MEANS OF CUTTING METAL AND MANY OTHER MATERIALS

There's a revelation in store for you if you have never tried friction sawing with these machines. Flat sheets of either soft or hardened steels, non-ferrous materials can be sawn in a fraction of the time required by other methods. Cutting armor plate and other materials is not impractical, and for cutting formed parts there's nothing that compares with it. Cuts are smooth and down-drag of saw is so minor that no rest of any kind is needed. Write for your free copy of "FRICTION SAWING", Now!

For trimming castings of all types of metals our variable speed band saws are real production expediters. Write for bulletin.

SAWING MACHINERY SPECIALISTS

he TANNEWITZ WORKS

RUGGED ALTERCUT REAMERS

Outperform ALL OTHER REAMERS



A really rugged application for any reamer is the illustrated clearance reaming of cast iron burners for pilot generators. This reaming operation is particularly tough on reamers because they often encounter insufficient stock to cut at highest efficiency and sometimes only rub.

Under these adverse conditions, ordinary reamers would soon dull and need resharpening. Yet, this west coast manufacturer reports the 1" diameter Altercut reamers, which are operated at 75 S.F.P.M.; consistently provide between 2500 and 3000 holes per grind to outperform all other reamers matched against them. There is a Whitman & Barnes reamer for your job—try it today for better results and reduced costs.



YOUR INDUSTRIAL DISTRIBUTOR
Can Give You Quick Service
On Whitman & Barnes Tools.
Contact Him Today!



WHITMAN & BARNES

40045 Plymouth Road & Plymouth, Michigan

HEAT TREATING FURNACES

31 MODELS—A Complete Source of Small Heat Treating Furnaces

Cooley Heat Treating Furnaces are used for heat treating operations from 300° F. to 2500° F.

A special Cooley feature is a package unit comprised of furnace and integrally wired control panel, incorporating pyrometer, line switch and fuses—all completely factory wired.

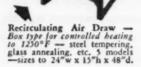
Indicating controlling Pyrometers are available with all Cooley Furnaces.

Bench Type — For tools and small parts — to 2000°F 14 models and sizes to 10" w x 8" h x 18" d.



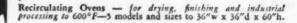
Industrial Box Furnace — General heat treating — to 2000°F 4 models and sizes to 15" w x 12" h x 30" d.







High Temperature Box Furnace — For high speed steel treating to 2500°F — 3 models and sizes to 12"w x 8"h x 24"d.

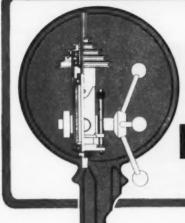


Write for Catalog and Complete Details

ELECTRIC MFG. CORP.

36 SOUTH SHELBY STREET





BETTER DRILL VALUE

—A
WELL-DESIGNED
SPINDLE

Note the long-life, accuracy and ease of operation designed into the spindle assembly of a "Buffalo" No. 15 Drill, above. Spindle is alloy steel, machined to close tolerances, ground and polished. Spindle and pulley turn smoothly without end play, on precision "sealed-for-life" ball bearings. Pulley and spindle are so accurately fitted to the spindle that up-and-down action is almost effortless, yet without play. WRITE TODAY for Bulletin 2963-G—see these and other features that mean lower cost output for you, with better-built "Buffalo" Drills!



"Buffalo" No. 15 Heavy-Duty Bench Drill

BUFFALO FORGE COMPANY

161 Mortimer St., Buffalo, New York

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.



DRILLING . PUNCHING . SHEARING . BENDING



RETAIN CONTROL

with INSPECTION and CODE STAMPS



V





These inspection and code stamps enable a manufacturer to retain control of his product wherever it goes. A single glance can provide such information as the identity of a welder, inspector, operator, or assembler—heat number, lot number, material or date of manufacture.

Choose your own code from any of 300 stock designs, available in any desired size, in either the economical HI-DUTY Brand or even longer-lasting HI-LOY Brand. You'll get permanent identification through use of code designs, with key letters or figures if desired.



Geo. T. Schmidt marking engineers will help you develop a code control plan without obligation. Write for particulars.



1802 Belle Plaine Ave.

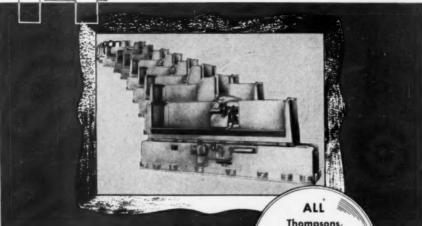
Chicago 13, III.



OF GRINDER PRODUCTION AND SEE WHY...

is a lucky number

for a manufacturer requiring precision grinding



After twelve years continuous manufacture of precision ground products, ten Thompson Surface Grinders proved so efficient and economical that this manufacturer ordered four more machines.

Thompson Grinders are available in a wide range of types and sizes from 6" x 18" to 72" x 384" to meet all production, special or tool room grinding requirements. The Thompson line includes machines from giant Hydrial Way Grinders to automatic Truform Jet Blade Contour Grinders, Dual Rotary Grinders and Broach Grinders.

CONTACT THOMPSON TODAY FOR HELP WITH YOUR MACHINING PROBLEMS

Thompsons.
operated continuously
with much
LESS
DOWNT:ME

thats why

to invest in

Thompson Grinders

NEW Type U4 Norton Universal Grinders-12"x 36" and 12"x 48"-feature unbeatable versatility...



Quick, Easy Set-Ups plus fast grinding action enable this new Norton 12" grinder to cut time and costs in a wide variety of external, internal, face and angular wheel feed grinding jobs. Here the internal grinding spindle is shown swung up and out of the way while a shaft is being ground.

Permanent Chuck Mounting is an outstanding advantage. Headstock spindle has a dog drive plate on one end. On the other is a 5° D-1 cam lock nose on which you can leave a chuck mounted permanently — merely swiveling headstock 180° to start chucking jobs faster.



Greatly simplified set-ups give you more time for grinding

Double-barreled good news! The new Norton universal grinders are made in 12" x 36" and 12" x 48" work capacities!

Versatility keynotes the design with feature after feature increasing job range, and cutting operating costs.

Some of the most important features are illustrated here. It will pay you to look them over carefully — and consider their advantages in your own production.

Get the whole story

on the broad operational scope and fast, precision performance of these new Norton 12" grinders. See your Norton Representative, or write us direct. And remember: only Norton offers you such long experience in both grinding wheels and machines. NORTON COMPANY, Machine Division, Worcester 6, Mass. In Canada: J. H. Ryder Machinery Co., Ltd., Toronto 5.



Advanced Design includes a work speed range of 40 to 400 r.p.m. You get an infinite number of speeds over this wide range simply by turning a dial.



For Quick Change-Over to or from internal grinding, the internal grinding spindle is permanently hinged to front of wheel slide. This also enables you to perform both internal and external grinding on a single workpiece without changing the set-up.



Settings At Any Angle are possible for wheel and feed, independently, with this compound wheel head slide. Wheel head has swivels above and below slide ways; upper wheel head member can be positioned to extend capacity when wheel head is swiveled.



Greater Shaft-Grinding Capacity is assured by the hollow spindle in the headstock, A 1½" hole clear through the headstock spindle permits passage of shafts that may be longer than the machine—another typical advancement that means greater versatility and usefulness.

To Economize, Modernize With NEW

NORTON

GRINDERS and LAPPERS

Making better products ... to make other products better

District Sales Offices:
Worcester • Hartford • New York • Cleveland
Chicago • Detroit



precision-pierced parts of these and similar products are produced in small lots with low tooling cost WITHOUT LAYOUT — WITHOUT SET-UP











A WIEDEMANN PIERCES SMALL LOTS COMPLETE, IN LESS TIME THAN LAYOUT BY CONVENTIONAL METHODS.

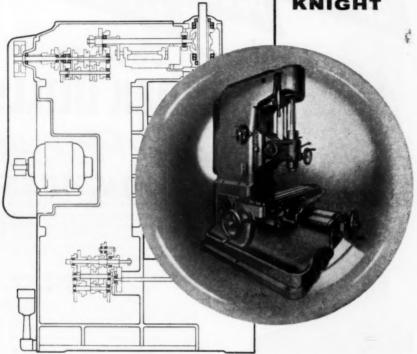
We'll gladly make a time study on your work.

WIEDEMANN MACHINE COMPANY

4265 Wissahickon Avenue, Philadelphia 32, Pa.

NEW DEPARTURES AT WORK

all through the KNIGHT

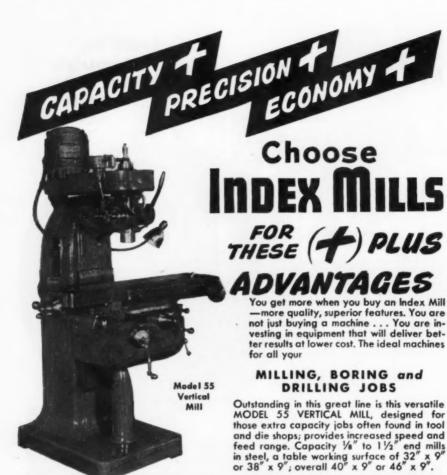


Combining great capacity with exceptional accuracy, W. B. Knight's No. 50 is a versatile milling and boring machine. New Departure ball bearing applications are found literally throughout the Knight. They assure rigid support of moving parts . . . maintain accurate pitch-line contact of gears . . . give longer life with minimum maintenance.

New Departure ball bearings offer operating advantages to your product. Call in your New Departure engineer... find how ball bearings make a good product even better.

NEW DEPARTURE BALL BEARINGS

NEW DEPARTURE . DIVISION OF GENERAL MOTORS . BRISTOL, CONNECTICUT



MODEL 40 VERTICAL MILL

For speedy, economical milling, Spindle gives 9 speeds, 125 RPM to 2250 RPM. Easy to operate. Rugged, for every day operation; also used for bering and locating. Copacity ½ to 1 ond mills in tool steel. Table working surface 8" x 26", 8" x 34" overall.

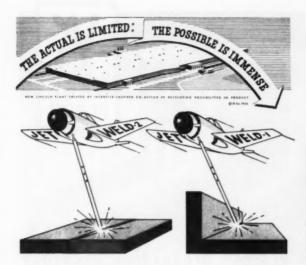
MODEL 60 HORIZONTAL MILL

Simple, efficient, compact, with all operating parts enclosed, yet readily accessible. Unusually low-priced. Designed for the average tool room, yet highly suitable for production shops through its rigidity and low maintenance cost. Standard table 40" x 9", larger table optional.

INDEX BUILDS BETTER MILLS . . . WRITE FOR LITERATURE

540 M. MECKAMIC STREET

JACKSON, MICHIGAN



JETWELD'S COST-CUTTING TEAM SPEEDS WELDING 35% AND MORE

FOR THE FIRST TIME, Lincoln Jetweld joins powdered metal with the electrode to achieve fastest hand welding speeds ever accomplished. Jetweld's phenomenal speed lies in utilizing the maximum heat of the arc for melting the parent metal, core wire and coating.

GET JETWELD'S COST-CUTTING FACTS TODAY... Have your Lincoln welding engineer demonstrate Jetweld's many cost saving features.

Or write for free Bulletin 481.



Extra fast electrode for flat, deep grooves and flat and horizontal fillets.

Tensile strength (As welded) 62,000 psi minimum

Yield strength (As welded) 52,000 psi minimun

Elongation in 2" (As welded) 25% minimum JETWELD-1

Extra fast electrode for flat and horizontal fillets.

Tensile strength (Stress relieved) 80,000—90,000 psi

Yield strength (Stress relieved) 65,000—75,000 psi

Elongation in 2" (Stress relieved)
25%—30%

Jetweld electrodes have been tested and approved by the American Bureau of Shipping and are coriffed to conform to AWS classes E-7020 (Jetweld 1) and E-6020 (Jetweld 2).

This certification authorizes the use of these two electrodes in shipbuilding supervised by the American Bureau of Shipping and the U. S. Caast Guard.

BENEFIT THREE WAYS WITH LINCOLN JETWELD



35% AND FASTER welding speeds are possible with the new Lincoln Jetweld electrodes. That's because powdered metal coatings utilize the heat of the arc more efficiently to increase welding speeds. Iron powder, melted by excess heat available in the arc, becomes an additional source of metal for the weld.



HIGHER QUALITY Weld metal is uniform, of X-ray quality, free of undercut with improved impact values at low temperatures. There is no coating breakdown . . . stub losses are less. Bead appearance is smooth . . looks like an automatic weld.



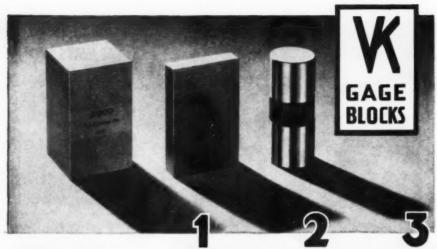
LESS CLEANING is required with Jetweld. Heavy coating and short are prevent spatter. Slag is self-cleaning. Excellent "wash-up" eliminates undercutting and entrapped slag.

THE LINCOLN ELECTRIC COMPANY

Dept. 3603

CLEVELAND 17, OHIO

THE WORLD'S LARGEST MANUFACTURER OF ARC WELDING EQUIPMENT



THREE WAYS to protect production accuracy

To meet closest limits of accuracy and protect production, Van Keuren is currently furnishing three types of gage blocks:

- 1-SOLID SQUARE MASTER BLOCKS
- 2-RECTANGULAR REFERENCE GAGES
- 3-MICROGAGES

Shipment on complete sets of any of these three types can be made within 60 days from receipt of order.

VK Solid Square Master Blocks are accurate to .000004" per inch of length and are designed for laboratory use or to standardize all shop dimensions, Large wearing surface; perfect parallelism. Available in 85- and 41-block sets and guaranteed unconditionally for 5 years not to exceed .0001" in wear.

VK Rectangular Reference Gages are guaranteed accurate to .000008" per inch of length and are designed for the inspection department or precision set up work. They are available in 81-block and 33-block sets, Individual

blocks from either of these sets can also be furnished. Certificate of size is also furnished with each set.

VK Microgages are accurate to plus .000012", minus .000008" per inch of length and are designed as working gages for shop use . . . to put accuracy at the machine. Wearing surface is 40% greater than that of rectangular gage blocks hence their long-wearing quality. Available in several set combinations.

Van Keuren Gage Blocks are fully described in Catalog and Handbook No. 35, yours for the asking by writing The Van Keuren Co., 177 Waltham St., Watertown, Mass.



THE Van Keuren co.

177 WALTHAM STREET, WATERTOWN, MASS.
Light Wave Equipment • Light Wave Micrometers • Gage
Blocks • Taper Insert Plug Gages • Wire Type Plug Gages •
Measuring Wires • Gar Measuring System • Shop Triangles • Carboloy Cwented Carbide
Plug Gages • Carboloy Cemented Carbide Measuring Wires •
Chrome Carbide Taper Insert Plug Gages.



Speed up the job with the NEW ROTOR IMPACT WRENCH



NON-FATIGUING. Weighs only 3 lbs.
Well balanced. No stalling shock. No twist.

LOW MAINTENANCE • Fewer parts . . . some interchangeable . . . some reversible. Steel clutch housing. Rugged throughout.

Compared to hand methods, the J-2 will boost your production at least 50%. Try it and see for yourself.

Ask for a demonstration. Write for Bulletin 41.



| MODELS | Blows per Minute | Length | Weight | Square Drive* | Side to Center | Hose Connec- tion | Rated Capacity (Balt Size |
|-----------------------|------------------------|--------|--------|------------------|----------------------|-------------------------|---------------------------------|
| J-2-5 Side Handle | 2100 | 6" | 3# | 1/2" | 1%" | 14" | 14" |
| J-2-L Lever Hondle | 2100 | 7¾" | 31/4# | 1/2" | 11/4" | 14" | 14" |

"%" square drive or 1/4" Quick-Change Chuck is optional.



See how times have changed for the

Charles L. Jarvis Company!

Middletown, Connecticut

CLEVELAND a double duty THE REASON: DIALMATIC

> Parts shown half size BAR JOBS:



Part: Handpiece Shell



Part: No. 2 Morse Taper Shank

AB Cleveland time: 3 min. | AB Cleveland Time: 2 min.

rarr: nandpiece snell

Part: No. 4 Morse laper Shank



AB Cleveland time: 3 min. Material: SAE 4160 Part: Pinion Gear







Many component parts for Jarvis "Multi-Tappers" and other power tools and accessories manufactured by The Charles L. Jarvis Co., Middletown, Conn., are now being produced on the Model AB Cleveland Dialmatic At the Jarvis plant, this Cleveland Single Spindle Automatic is doing double duty! As components are machined both from bar stock and rough castings . . . and as this Cleveland can be quickly converted from a 3"

... a wide range of parts are turned out at outstanding bar machine to a chucking automatic having 6" swing time savings!

details and specifications, write for bulletin describing the 3" Model AB. Other sizes and models available. Typical parts are shown above, listing comparative machining times. Note the time savings, Let a Cleveland Sales Engineer show you how a Cleveland Dialmatic can produce similar savings for your shop. For machine

Remember: Clevelands Cut Costs

THE CLEVELAND AUTOMATIC MACHINE COMPANY

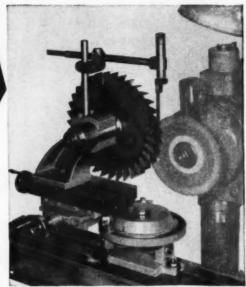
4934 Beech Street Cincinnati 12, Ohio SALES OFFICES: CHICAGO CLEVELAND . DETROIT HARTFORD . S. ORANGE Manufacturers of a Complete Line of Single Spindle Automatic Screw Machines and High Pressure Hydraulic Die Casting Machines

UNIVERSAL ADIA CUTTER IXTURE

Does 5 Operations without removing cutter from its ARBOR!

On cutters up to 8" in diameter, the No. 6 fixture, as shown with our No. 6A heavy-duty, rightangle, ballbearing spindle workhead:

Sharpens side teeth on both sides. Sharpens peripheral teeth. Generates small or large radii on both corners of each tooth. (Other workheads available)



▲ THESE DEPENDABLE GRINDING FIX-TURES SAVE THE LIFE OF YOUR CUTTERS. Write for our catalog 602



Radial Grinding Attach-ment D combines with Unit 1A for sharpening end mills with square, conical, or ball nose shapes.

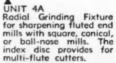


UNIT IA This Universal Cutter Grinding Fixture fits any universal tool or surface grinder.





UNIT 4A Radial Grinding Fixture for sharpening fluted end mills with square, conical,



ROCHELEAU TOOL & DIE CO. 650 North Main St., Leominster 1, Mass.

Export Office: States Trading Co., 401 Broadway, New York 13, New York. Cable Address: STRADESO, N. Y.

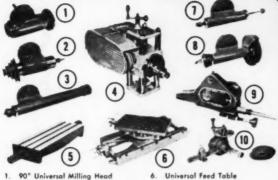


MASTER MACHINE TOOL ATTACHMENTS



Build Special Production Machines with Master Heads and Independent Fooding Mechanisms! Save Time and Money by Relieving Your Independent Machines!

The Master attachment can be used profitably on many production operations. Mount it on your present equipment, lathes, turrets, mills, or use independently to perform additional operations in the same set-up. The basic milling unit with the above types of precision heads gives you facilities for milling, grinding, thread milling, boring, drilling, indexing, slotting, and keyseating, internal and external. Performs all operations for maintenance, tool room, and production at a minimum investment.



- Hi-Speed Milling and Drilling Head
- Deep-Hale Internal Grinder Head
- Basic Milling Unit
- 5. Milling and Grinding Table
- Internal Grinder Head
- External Grinder Head
- Slatting and Keyseating Head 10. Geored Dividing Head



End Milling 21/2" Keyway in 97/8"
Diameter shaft 22-ft. Long

MASTER LATHE CONVERTER is available in four sizes:

Model "C" 1/2 H. P. -9" to 13" Lathes Model "B" 1/2 or 3/4 H. P. -13" to 18" Lathes

Model "M" 1 to 3 H. P. -18" to 72" Lathes Model "H" 5 H. P. -24" and Larger Lathes

THE REVOLUTIONARY NEW TURRET-MASTER is a small, compact, powers tool head for turrent lathes, which powers the tool for either on or off cent milling, drilling or boring, can be assembled for horizontal or vertical spindles 1/2 to 3 H. P.

THE GEARED VERTICAL MILL HEAD amplifies operations of horizontal mil ing machines by combining independent power and double compounded swivel for angular positioning with capacities from 34 H. P. to 5 H. P.

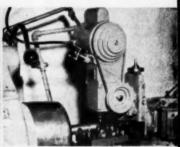
For the cost of one single-purpose machine, you can have several Master units producing. Prompt deliveries!



Master Slotting Head on Lathe **Cutting Internal Taper Keyway**



Geared Vertical Mill Head on a Horizontal Mill



Turret-Master End Milling Keyway on a Turret Lathe



Ask your nearest Master dealer to show you '
the new 80-page Pictorial Operational Book.
Write direct for free 24-page Catalog.

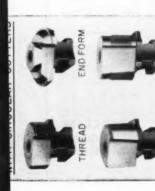
STER MANUFACTURING CO.

2 EAST AVENUE A . HUTCHINSON, KANSAS, U.S.A.

Mulfield



When Whitin Machine Works, Whitinsville, Mass., applied





THREAD and MIL COMBINATION



BURNISH

KNURL

CUTTERS WITH BLADE





When Whitin Machine Works, Whitinsville, Mass., applied heir 15/8" standard Vers-0-tool to one-pass knurling this texile machine part (7" long, B-1113 steel), they stepped up former production from 72 to 128 pieces per hour.

They get a higher quality too, because the 4-cutter Vers-ofast without contact to damage the sharp knurl. Thousands tools equipped with multiple chasers or cutters such as tool head opens instantly at the end of the cut and pulls back of different jobs are run every day with standard Vers-othose shown at the left.

ing, equipped with the long lived Ground Thread Circular Chasers—most economical for long runs—or with the lower-Most of these simple, rugged heads are used for threadcost Adjustable Blade Ground Thread Chasers for smaller lots. All guarantee Class 3 or pressure-tight quality threadsand smoother. Conversion from Circular Chaser threading to any other type multiple cutters is simple: you change only the cutters and blocks-all types of which are interchangeable, head size for head size, for revolving or non-revolving heads. Vers-o-tool capacities range from .056" to 61/2".

step up your OUTPUT, guarantee ACCURACY, reduce your TOOL INVESTMENT and your OPERATING COST. Ask us to show you how standard VERS-O-TOOLS can Ask for catalog DT-52.

24-hour deliveries on standard stockable NC and NF chasers and blocks. Also National Taper Pipe and Dry Seal.



and CHUCKING AUTOMATICS Thread Rolling Machines . Automatic Threading Dies and Taps . Limit, Motor Starter and Control Station Switches . Solenoids . 1-4-6 and 8 Spindle . Hydraulic Contract Manufacturing. ACME-GRIDLEY BAR

170 EAST 131st STREET . CLEVELAND 8 OHIO

MULTIFORM BENDERS



Big Brother

Air Operated

Now a faster method of changing setups on the stationery head. The head is built of alloy steel for greater strength.

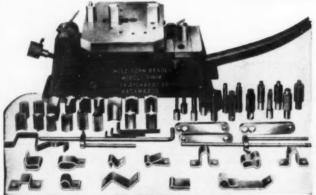
Eliminate Special Tooling Cost Reduce Set Up Time Boost Production

IF

Fabrication is a Problem Solve it with a Multiform.

Bus-Bars - Brackets Stampings - Springs Steel Rule Dies etc.

J. A. RICHARDS COMPANY KALAMAZOO, MICHIGAN



Model

Write today for literature

Hand and Air Models

At left is the No. 6HDSB MULTI-FORM BENDER CUTTER, Capacity 1/a" x 11/2".

See these machines in operation Booth 1632 ASTE show, Philadelphia April 26-30.

cut your costs...where you cut your materials



Production managers who take the trouble to keep a careful, day-to-day record of cutting operations are quickly convinced of the efficiency and economy of the Allison Abrasive Cutting Method. The score is there for all to see. Abrasive cutting with Allison Wheels cuts time, cuts effort, and cuts waste. It pays off in more pieces per hour at a lower cost per piece. For almost all materials to be cut, there is an Allison Abrasive Cutting Wheel to fit the job. For complete information on wet or dry cutting, ask Allison . . . specialists in abrasive cutting for thirty years.



The best way to cut many materials . . . the only way to cut some.



THE ALLISON CO., 264 ISLAND BROOK AVENUE, BRIDGEPORT 8, CONN.

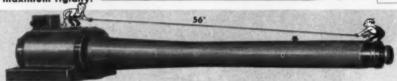
May, 1954

YOU CAN Specify POPE PRECISION SPINDLES WITH CONFIDENCE

TAKE THESE DEEP HOLE SPINDLES, FOR EXAMPLE

Only POPE <u>Deep Hole</u> Spindles are equipped with tapered bore, double row, <u>cylindrical roller bearings</u> <u>close to the wheel</u> for maximum rigidity.





POPE <u>Deep Hole</u> Spindles produce <u>more holes</u> per day because they can take heavy cuts; <u>superior finished</u> holes due to their shaft and bearing construction and Pope precision craftsmanship. Pope Spindles are <u>dynamically balanced</u> with all rotating parts in full assembly to insure smooth running and good grinding results.

Pope P-5886 Motorized Deep Hele Spindle — 75° overall length, 4" barrel diameter at the wheel end, 6" at the motor

and



LUBRICATION — Pope System. The bearings are permanently lubricated for their entire operating life and require no further attention.

Pope P-16022 Belt Driven Deep Hole Spindle



— an actual comment made by the operator of a Pope Deep Hole Spindle to a shop inspector.



Ask for detailed specifications and prices on Pope Heavy Duty Deep Hole Precision Spindles.

No. 98

Specify POPE

POPE MACHINERY CORPORATION

Established 1920

261 RIVER STREET . HAVERHILL, MASSACHUSETTS

New Non-Flammable



PEELABLE PLASTIC BOOTH COATING BY PELRON

MAKES
PAINT BOOTH
OPERATION

SAFE

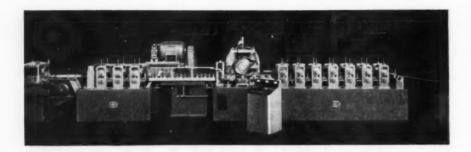
Here is new PELRON PLASCOTE 284—a new plastic booth coating that is non-flammable either as a liquid or as a dry film on the booth. This means not only greater safety in booth maintenance operations, but also a reduction in insurance costs.

Due to the ease of application and extensive coverage, booth maintenance costs may be reduced by more than 50%. PLASCOTE 284 is shipped ready to use—no premixing necessary—will dry to a tough peelable film in a matter of minutes.

Order a 5 gallon trial quantity at regular drum price. Do it now and learn how this revolutionary new coating gives more protection to your employees and plant!

PELRON Corporation

7740 W. 47th Street Lyons, Illinois Phone BI shop 2-3166 (Chicago)



Three Epoch-Making New Yoder Developments

step up scope and economy of *Electric-weld* Tube Manufacture

1. For high-speed, low-cost production of tubing from aluminum, nickel, brass and other non-ferrous metals and alloys: Revolutionary new high-frequency electric induction mills for cold-forming and welding coiled strip into tubing, without drawing or heat treating. Welding speeds from 30 to 120 fpm.—almost as fast as electric-weld steel tube making. The lighter the gauge, the higher the speed and lower the cost, all the way down to .025".

2. New Induction-Weld Mill for making STEEL tubing up to 4" dia. and merchant pipe up to 2" dia. Speeds up to 250 fpm.—almost double that of resistance welding. 3. New 4-in-1 Resistance-Welding Transformer-actually four small transformers built into the most compact, efficient, trouble-free unit ever designed for tube welding. Insures highest daily production of quality tubes, with minimum scrap loss, All three developments are Yoder "Firsts"-making cold process tube manufacture more attractive than ever. For detailed information and literature, write, phone, or wire

THE YODER COMPANY- 5509 Walworth Ave. · Cleveland, Ohio

Complete Production Lines

- * COLD-ROLL-FORMING and auxiliary machinery
- * GANG SLITTING LINES for Coils and Sheets
- . PIPE and TUBE MILLS-cold forming and walding



MCCROSKY

1904-1954

COST

50TH ANNIVERSARY

Jack-Lock®

MILLING CUTTERS

Face Mills, Shank and Shell End Mills, Half Side and Staggered Tooth Designs

Standard Sizes from 3" to 24" in Diameter







Carbide Tipped or High Speed Blades for Cast Iron, Steel and Aluminum

Engineered to match the ruggedness and power of modern machines, McCrosky Jack-Lock® Milling Cutters will give you a maximum of highly efficient service.

McCrosky's Jack-Lock® wedges hold the blades rigidly and solidly in the body; yet permit easy release of the blades; and relocking again, rigidly and solidly, without hammering or pounding.

Fine pitch adjusting screws permit the blades to be advanced accurately against an indicator, reducing to a minimum the amount of blade stock lost in regrinding; and minimizing purchases of new blades.

Sizes and designs for every requirement. Write for Bulletin No. 17-M.

MCROSKY Universal MILLING CUTTERS

Body can rotate either right or left hand. Consequently, selecting blades with tips of proper material mounted at proper angles produces a cutter that meets any requirement. Write for Bulletin 531.



MCROSKY Wizord ® QUICK-CHANGE CHUCKS

McCrosky's Wizard Quick-Change Chuck and Collet outfits hold tools centered and rigid. They enable the operator to change tools without stopping or slowing down the spindle. Write for Bulletin 18-8 today.



McCROSKY Super® Adjustable REAMERS

Chucking reamers with straight or tapered shanks, also shell reamers with tapered holes or large straight holes. Standard sizes from 15/16" to 6" in diameter. Write for Bulletin 18-R today.



MCROSKY Turret

These tool posts permit tools to be swung into position quickly, indexed accurately, and locked rigidly. Four styles—11 sizes. Write for Bul. 18-T.



MCROSKY Block Tupe BORING BARS

Individually ground, tapered V-key centers the block and cutting blades accurately and rigidly yet permits easy release for regrinding. Write for Bul. 18-8.



McCROSKY Multiple Operation

TOOLS McCrosky "Specials" combine two or more boring, facing, chamfering or reaming operations into a single tool, cutting set-up time and costs. Write for Bulletin 17-5 today.





CORPORATION

Engineering and Salus Representatives in the Principal Cities



JIG GRINDING ACCURACY guaranteed*

EASILY CONNECT

this jig grinder to jig borer or mill (The "Vulcanaire" has infinite controlled speeds 30,000 to 65,000 R. P. M.)

For immediate quotation please state machine tool application. Get this manual of photos showing operations Vulcanaire performs. *Dependably accurate to "tenths"



Then you can finish grind in hardened steel to "tenths"...
jig grind dowel holes square with a ground base... move location of holes in hardened steel blocks... jig grind interchangeable holes in hardened sections... grind small holes with diamond impregnated mandrels... grind contours and relief with tungsten carbide burrs... grind radii in die sections... eliminate jig bushings in tools where close spacing is essential.

Other infinitely controlled air driven spindle applications

Place spindle on most any machine. Use it for finishing contours on hardened steel working surfaces . . . burring or milling die castings . . . routing wood contours . . . carbide milling or finishing slots . . . finishing holes in hardened steel to "tenths" . . . grinding with diamond wheels, carbide burrs, or diamond impregnated mandrels.

Advantages—10 micro finishes using carbide mills . . . 6 micro finishes using mounted points, operates at any angle . . . air driven, air cooled, overheating prevented . . . speed controlled at optimum point . . . 3 1/4 " long motor uses little working space . . . By controlling speed at any point you obolish need for many constant speed spindles.

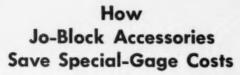
MAJOR VULCAN SERVICES

Engineering, Processing, Designing and Building, Special Tools, Dies, Special Machines including the Vulcan Hydraulics that Form, Pierce, Assemble and Size.

VULCAN TOOL CO.,

Highland and Lorain

DAYTON 10, OHIO



Johansson Gage Blocks and Accessories may be quickly assembled into actual working gages that perform literally hundreds of high-accuracy measurements. Used as "Go"—"Not Go" gages, trammels, height gages, etc., they keep gage construction costs at a minimum . . . provide economical gaging set-ups for even the shortest runs. And they make precision standards practical "on the job" . . , at every stage of manufacture.

Brown & Sharpe Jo-Blocks are available singly or in sets—for use as laboratory or working standards. The many Accessories extend their use to almost limitless applications. Write for complete Catalog. Brown & Sharpe Mfg. Co., Providence 1, R. I., U. S. A.

BUY THROUGH YOUR LOCAL DISTRIBUTOR

Brown & Sharpe



CENTRIFUGAL

COOLANT PUMPS

FULFLO PUMPS PAY FOR THEMSELVES IN PROLONGING TOOL EFFICIENCY

FIRST RULE for any tool . . . KEEP IT COOL . . . so destructive friction and overheating can't hasten obsolescence and add to costs by too frequent overhaul or replacement.

A good rule, too, is to let FULFLO COOLANT PUMPS pump and circulate your coolants right to the right spot.

Direct, motor or belt driven. Vertical or horizontal installations. Capacities from ¼ HP to 1 HP; pipe sizes from ¾" to 1½".

WRITE FOR PERSONAL COPY—on your letterhead—of FULFLO MECHANICAL DATA BOOK, Please state if for Pumps, for Valves or for both.



MODEL FVM vertical MODEL FHM horizontal Flanged mounts; ½ h.p.; 30 gal. per min., mechanical seal.





THE FULFLO SPECIALTIES CO. Inc.

BLANCHESTER, OHIO

fast, cool-cutting is in the bag!



A new protective bag! Polyethylene cellophane coated—heat sealed. Brings you clean, factory-fresh Simends toolroom wheels every time you order. Ideal for high carbon, high chrome and other toolroom steels. Order from your Simends distributor.

SIMONDS ABRASIVE COMPANY
PHILADELPHIA 37, PA.

WITH SIMONDS

W BOROLON
GRINDING WHEELS

BRANCH WAREHOUSES: BOSTON, DETROIT, CHICAGO, PORTLAND, SAN FRANCISCO · DISTRIBUTORS IN PRINCIPAL CITIES

DIVISION OF SIMONOS SAW AND STEEL CO. FITCHBURG MASS . OTHER SIMONDS COMPANIES SIMONDS STEEL MILLS, LOCKPORT, MY SIMONDS CANADA SAW CO. LTD., MONTREAL, QUEBEC AND SIMFMOS CANADA ABRASIVE CO., LTD., ARVIDA, QUEBEC

Quick Change Tools

FOR

- BORING
- MILLING
- DRILLING
- & TURRET
- · LATHE USE



P. D. Q. (PORTAGE DOUBLE-QUICK)

Changes from one tool to another is a matter of seconds. Three point locking

feature and tapered shank assures repositioning and eliminates "run out." Send for catalog describing individual holders and adapters or for specific information on your machine tools.

PORTAGE Double-Quick TOOL CO.

1037 Sweitzer Avenue · Akron 11, Ohio

Featured in this issue

| Chip Breakers | 153 |
|--|-----|
| Increase Bending Speed From 288 to 456 Pieces Per Hour . | 166 |
| Fusion Welding Titanium | 176 |

Increase Bending Speed From 288 to 456
Pieces Per Hour. A discussion of the bending operations at the Acme-Lees Div., The
Serrick Corp., who bend a wide variety of
decorative trim strips, moldings, etc., for
the appliance field. Article discusses some
interesting fixtures and procedures which
have increased bending speeds almost
100%. Page 166

Fusion Welding Titanium, by Francis H. Stevenson. Commercially pure titanium can be fusion welded without great difficulty. Welding techniques must be selected carefully. Welds are made with the inert gas shielded tungsten are process with TI-75A and RC-70 materials. Direct straight-polarity current and thoriated tungsten electrodes were satisfactorily used. Welds were produced on a special fixture. Tests determine success of the method. Page 176

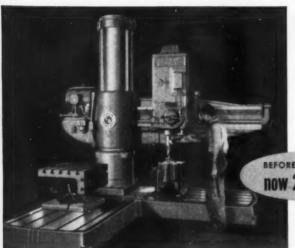
Automation Produces Refrigerators for Westinghouse. Two refrigerators are coming off the Westinghouse (Columbus Plant) every minute. After material is released to manufacturing, machines do everything.

Practical Hints on Drilling Light Gage Stainless Steel, by G. L. Stevens. Many shops have been discouraged from drilling light gage stainless; yet the operation can be performed easily and successfully with the proper drill grind and setup. Page 193

New Dial Indicator Design Features Only Four Moving Parts, by Robert C. Souers. A new feature in the BLUE BOOK is this Design and Operations type of article. Each month a new piece of equipment or accessory will be analyzed from the design and operations standpoint. This month discusses a new type of dial indicator which promises long life and is claimed to retain its accuracy longer than the gear train type.

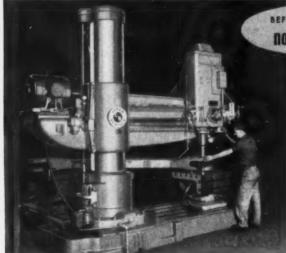
Page 198

BICKFORD .



floor ime!

BEFORE 38 MINUTES now 23 minutes



BEFORE 5 HOURS now 3 hours

> These two jobs are done with time savings at the Ohio Steel Foundry Company of Lima, Ohio.

> The machine (upper illustration) is drilling breech rings for guns from 76MM to the 155MM size. In this tough material a 21/2" diameter lead hole is drilled and opened up to a 31/2" diameter with a core drill.

> Machine, below, is drilling 35%" lead holes in a 9-foot Ladle Vale. Holes are opened up with a single point boring tool. Time savings result from the outstanding ease of control, and the power and rigidity of Super Service Radial Drills.

> For power, accuracy, easy handling, check on Cincinnati Super Service Radial Drills.

Write for Catalog R-29.

CINCINNATI



Cincinnati 9, Ohio, U.S.A.

RADIAL AND UPRIGHT DRILLING MACHINES

THE CINCINNATI BICKFORD TOOL CO.

AS THE



The Faint and the Strong

The president of a metalworking plant went to Florida recently for a vacation. While there he met with other presidents (also vacationing). He returned to the wintry north and promptly cancelled all purchases, trimmed research funds, slashed his sales efforts, laid off workers and cut the head off his advertising program. Times are bad, he said, very bad indeed!

Now, what shall we say of such a thing? How recognize such firm and enterprising procedure?

This president's actions wouldn't be worth a stick of type in anybody's book if he were the only one with such a fighting spirit. Unfortunately, he is not alone. There are many presidents and other businessmen who have, and are, acting as boldly as our friend. Whether they picked up their courage in Florida while vacationing or whether they obtained it from one of the professional dopesters who publish the real-downto-earth-facts of business conditions which they lure from the depths of unwashed crystal balls-it makes no difference where they received their courage; the point is, they are slashing, cutting, retrenching and moaning because times are bad.

To be sure, business is not as good as it was last year. Production is down, unemployment is up. Is this sufficient reason for flapping hopelessly in the dust like a chicken and making squawking noises? Or could this, perchance, be the time for positive thinking? for aggressive action?

We are concerned over the business dip; there is no stigma attached to that. We are even more concerned over the antics of many quailing business men who are crying into their pillows. This lack of purposeful action is a sad commentary on the free enterprise system and some of its members. It harms everyone. It destroys faith. It is as harmful as the irresponsible mouthings of gloomsters, dopesters and those defeated politicians who'd like to see a depression in the hope of being returned to office.

Luckily, we have strong businessmen and a goodly share of responsible, intelligent leaders who are neither discouraged nor defeated because a slight breeze whips up the lake. The strong outnumber the faint. The strong will retain their strength; the weak will shrivel up and be blown away in the breeze.

Good riddance!

alicismo 7 Schleisher

way back in 1941 the LeBlond RT Lathe

13 years ago, LeBlond's RT Tool Room Lathe with these major

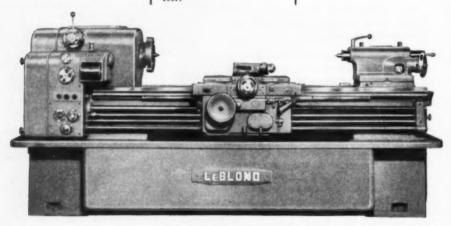


Satin-smooth Power Repid Traverse to the carriage and cross slide plus pick-up traverse to the tailstock. No jerking, jolting or jumping. Gives you the most in operator convenience as an integral part of the apron. First developed by LeBlond in 1935.

Automatically Positioned Leadecrew and Red Supports perfected in 1923.

A Universal Quick-change Box with 90 feeds and threads in two ranges. You can cut from 120 threads to 1/4 thread per inch - without setting pick-off gears, mounting a sub-head or using any other attachment. Diametral pitch threads, leads in inches, millimeter leads and module pitch leads also can be cut by making a slight gear change. Put into production by LeBlond in 1937.

Automotic Chasing Step, used primarily for cutting threads, limits cross slide travel positively and accurately. Makes possible speedy chasing, since cross and length power rapid traverse can be used to bring cross slide quickly back to exact starting position for each pass.



Condensed RT Lathe Specifications:

| Swing over bed and carriage wings 181/2" | Feed and thread changes |
|---|--------------------------------|
| Swing over compound rest | 30 coarse |
| Distance between centers, base length 30" | Feeds, range |
| Spindle speeds, range, rpm | |
| Low back gear 6 to 60 | Threads per inch, range |
| High back gear 30 to 300 | 74 - 1/8 coarse |
| Direct belt drive | Floor space required 96" x 48" |

had today's Most Wanted Features



RT Combined Feed Apren with built-in Taper Attachment achieved in 1939, Cuts gradual or steep tapers with larger dimension either towards the tailstock or headstock—without special machine set-uns. An Exclusive Off-set Handwheel Tailsteck employing a worm-and-rack construction for positive-position locking, greater operator convenience plus Hollow Tailstock Spindle adaptability. Equipped with a direct-reading spindle travel indicator, And in 1946, the Variable-vallege Speed Control was incorporated into the head to provide over 300 spindle speeds in three ranges controlled by a single lever.

After five years in development and four years of on-the-job testing in LeBlond's production line. Industry met for the first time the 16" RT Tool Room Lathe at the 1947 National Machine Tool Show. There the RT's spectacular features—far ahead of their time—caused a flurry of comment about its amazing versatility. This lathe could do almost anything.

Only within the last few years have tool engineers throughout the lathe industry built into their lathes those features of the LeBlond RT Lathe that were "new" back in 1935...in 1937...in 1941...in 1946. Features that made the RT Lathe famous for the ability to handle almost any job without time-wasting special machine set-ups. Even in 1947, there were many who felt their tool room requirements were not varied enough for them to take full advantage of the RT's vast potential.

By adopting those early RT features on their current models, lathe makers acknowledge the greatness of LeBlond's RT Tool Room Lathe, conceived almost 18 years ago.

THE R. K. LEBLOND MACHINE TOOL CO., CINCINNATI 8, OHIO

For a detailed description of the LeBlond 16" RT Tool Room Lathe and the lower-priced 16", 16-speed RT Engine Lathe, send for Bulletins RT-311 and HD-311.

turned faster by



WORLD'S LARGEST BUILDER OF A COMPLETE LINE OF LATHES-FOR OVER 64 YEARS.



James F. Lincoln Writes About Arc Welding

Man's material progress depends on how well and how economically in time and money he can join things together. This has been true since the dawn of history and especially true since the steel age began.

For over forty years, are welding has been a big factor in building the modern equipment used by man in every walk of life. However, progress is now being held back by limitations placed around the welding process by various codes, rules and regulations which are unduly severe.

These restrictions are promoted, no doubt, by well-intending persons but persons who do not see the economic folly of what they are doing. Arc welding has produced a record for reliability in billions of welds, over the years, that is unmatched by any other manufacturing process. Yet are welding is being tremendously handicapped in its application. This handicap is throwing suspicion on the process by writing into specifications expensive and impractical tests which have little to do with the excellence of the weld. Most of them have to do with infinitesimal variations of no possible importance but of high cost.

These restrictions have already eliminated the economic uses of welding in many proper applications, and if continued it will eliminate many others.

With modern are welding equipment and electrodes and with proper technique, it is almost impossible to make a weld which will be weaker than a riveted joint.

We see welding electrode specifications being written, however, which enormously increase the cost of production with no increase in either the reliability nor in the excellence of the structure.

Much time and expense is used in testing electrode deposits to make sure they have great ductility. The weld is rejected if its ductility is low. Yet riveted joints have no ductility, relatively speaking, and are accepted without question.

Every day we see riveted joints which are made tight by caulking. This is a standard accepted process. The resulting undercut is enormous yet a welding undercut that is almost infinitesimal in comparison is frequently made the reason for rejecting welds.

The contour of the deposit of the weld is a matter of close inspection but no one examines the contour of any rivet or the hole it may only partially fill.

Insured vessels must have their welds X-rayed, and we see welds chipped out and rewelded because of trifling porosity, yet no one X-rays a riveted joint.

The same thing is true of many other structures outside of insured vessels.

Any excess strain placed on the welded structure will distort the rest of the structure and render that structure valueless for its intended purpose long before the weld would fail. Yet such testing and rejecting is made mandatory in many structures but, of course, never in riveted structures.

Castings, both steel and gray iron, are rarely required to be X-rayed, yet from the material of the castings, it is well known that many hidden defects are present.

Over the forty years since arc welding has been in commercial existence, it has consistently done a more reliable job than rivets or castings. In spite of this experience, the engineering profession continuously requires these excessive and uneconomic tests and requirements.

This continued suspicion of the engineering profession toward welding, in spite of its enviable record, does not reflect credit on the profession.

It is high time that welding be given its proper place in manufacturing methods, without restrictions which are harmful. This will save the consumer hundreds of millions of dollars each year in lower cost of present structures and the making possible of a tremendous number of other structures now eliminated by these impractical and unscientific rules.

> James F. Lincoln, President The Lincoln Electric Company

Requests For Jet Issues

This Laboratory maintains a current file on research information for the use of its engineers, draftsmen, etc.

It would be appreciated if you could furnish us four copies of your Jet issue for distribution to our Engineering Drafting Division.

William Dey, Jr., Procurement and Supply Officer National Advisory Committee for Aeronautics

Our Engineering Department has requested four copies of the article entitled "Machining the Aviation Gas Turbine High Temperature Alloys" which starts on page 206 of the January Jet issue. I would appreciate it if you could send me four copies so that I can pass them on to the interested parties.

R. A. McCleneghan, Adv. Mgr. Barber-Colman Company

There has been considerable interest in the nine articles on Jet Engines appearing in the January issue of BLUE BOOK. The demand for copies here at Solar has resulted in the few copies that we have being passed around until they are dogeared.

We would appreciate any additional copies of the article or of the BLUE BOOK that you could send us.

Tool Engineering likes particularly the article by Fred Lucht on carbides. It is most comprehensive.

Francis Hanratty, Tool Eng. Solar Aircraft Company.

Please forward, to the attention of the writer, six copies of the article entitled "History . . . Types . . . Operations . . . Parts of Jet Engines" appearing on page 147 of your January, 1954, publication.

M. H. Touse, Asst. Purchasing Agent The Weatherhead Company

Your MACHINE and TOOL BLUE BOOK, issue of January 1954 (Jet Power Issue), has attracted considerable attention among some of our clients and we would appreciate receiving three additional copies of this issue if they are available.

H. E. McElroy, Vice Pres. Manufacturers Eng. Service, Inc.

Copies of the Jet issue have been sent to the above. Extra copies were printed of the January Jet issue. Copies are still available and as long as the supply lasts they will be sent to all interested readers.

Time Study

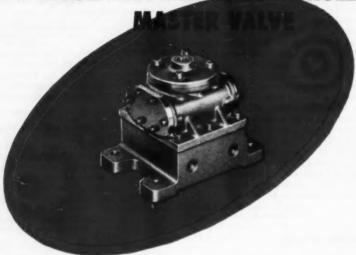
It was with a great deal of interest that I read the first article by Harold R. Nissley in your March issue.

Although not concerned directly with time study work, it has a bearing upon my work as tool engineer. I would appreciate, if possible, receiving a complete set of Mr. Nissley's articles for my personal files.

E. M. Taylor, Tool Engineer Mueller, Ltd.

A tear sheet of Harold Nissley's article has been sent to reader Taylor. This is the only article by Mr. Nissley to have appeared recently. He is presently preparing several other articles on this subject which will be published in the BLUE BOOK.

Ross four way remote controlled



- Retrold Series 56E
- May Be Removed without Disturbing Piping
- For Air and Other Service
- Parts Interchangeable with Other Ross Four Way, Base Mounted Valves

Write for Engineering Data No. 5411

{ Ross EnginAIRing - Leads in Air Controls }



Ross

OPERATING NATUE COMPANY

108 E. GOLDEN GATE AVENUE . DETROIT 3 . MICHIGAN

LAST MINUTE WASHINGTON NEWS



by Arnold Kruckman

Washington Correspondent



The departments of Commerce and Labor early this year surveyed the machine tool industry. Their reports came from 197 establishments, each of fifty and more workers, representing an aggregate employment list of 102,600.

Downtrend in new orders, backlog of orders, continued during 1953; total employment little changed; difference reflected chiefly in reduction of volume of overtime work; fewer problems of manpower; shortages cut in half between January and December, 1953.

This forecasts net decline of about 2% in workers by July, 1954; general outlook is not unfavorable; industry believes investments in modern equipment will more than offset future reductions because of less government work.

The backlog of orders went from 124.1 in June, 1950, to a postwar peak of 615.3 in February, 1951; since then there has been a decline reaching a post-Korean low of 146.6 in November, 1953, but going up to 149.2 in December.

Monthly shipments have remained high; Business and Defense Services Administration says its recent order authorizing manufacturers of all except four types of machine tools to increase the non-defense portion of their sales to 60% of production with June deliveries will make a considerable difference in the business. Formerly they were required to reserve 60% of their production for defense purposes.

The report is not pessimistic about future; definite pickup in orders during January, 1954, each week running well ahead of corresponding weeks in November and December; sharp reduction in rate of order cancellation and request by the administration for a revision in present tax laws, retroactive to Jan. 1 to permit faster amortization for machine tools. Also increasing pressure on metal working manufacturers to replace or modernize existing equipment is regarded as spur for better business.

Growing trend for machining at higher speeds and feeds through utilization of new automatic labor-saving devices, together with an increasing consciousness of costs; one of the major items in recently announced billion dollar expansion

(BAKER)

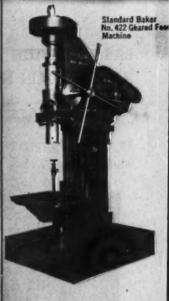
Standard HEAVY-DUTY DRILLS

2 to 4 WEEKS DELIVERY . . .

ON THESE MACHINES—Subject to prior sale









| | 150 | 150 Q.C.T | 217 | 321 | 422 |
|--|---------|-----------|--------|----------|--------|
| 1. Capacity-Max. Dia. Drill in S.A.E. 1035 Steel | 11/2 | 11/2" | 2 | 3 | 41/2 |
| 2. Max. H. P. Motor used | 71/2 | 71/2" | 10 | 15 | 20 |
| 3. Distance center of Spindle to Frame [Gap]* | 11" | 11" | 121/4" | 121/4" | 121/4" |
| 4. Maximum Spîndle Travel | 11" | 11" | 12" | 16" | 16" |
| 5. Spindle—Outside Dia. splined driving end | 134" | 134" | 2" | 2-13/16" | 3¼" |
| 6. Dia. of Spindle Sleeve | 23/4" | 2.750" | 31/4" | 41/4" | 51/4" |
| 7. Dia. of Spindle Nose | 2.975 | 2.975" | .3225 | 4.225" | 5.225 |
| 8. Morse Taper in Spindle as standard | No. 4 | No. 4 | No. 5 | No. 5 | No. 6 |
| 9. Standard Speed Range in R.P.M | 151-632 | 48-1120 | 76-614 | 27-220 | 20-165 |

* Can be increased 3" by use of offset Spacer Block, † Quick Change, 12 Speeds

Baker single purpose type drills are heavy duty . . . provide a wide range of speeds and feeds for Single and Multiple Spindle Drilling . . . Reaming . . . Boring . . . Facing . . . Chamfering . . . Undercutting and Tapping Operations. Write for full details.



BAKER BROTHERS, INC. Toledo, Ohio DRILLING... TAPPING... KEYSEATING and CONTOUR GRINDING MACHINES

program of an automobile manufacturer is an allocation for machine tools; interesting that virtually all of the nation's machine tool employment is located in the northeast and the north central section, and about two out of every three workers are concentrated in eleven labor-market areas.

There were some hard-to-fill demands for workers; professional, skilled and semi-skilled workers such as engineers, tool designers, draftsmen, machinists, tool makers, tool inspectors, milling machine operators, lathe operators, horizontal and vertical boring machine operators, and automatic screw machine operators. Some firms fight shortage by farming out work, overtime and operation of in-plant training programs.

The Bureau of Labor Statistics reports that between December, 1952 and December, 1953 the average weekly earnings of the workers increased from \$94.84 to \$96.14, and average hourly earnings rose from \$1.98 to \$2.09.

As usual the Senate Small Business Committee continues to make a case for small business being deprived of its share of defense contracts. Annual report of Sen. Edward J. Thye, chairman, stated: "The continued drop... stands at near all-time levels..." In automobile industry, independents' share of production dropped from 14% early in the year to about 3.7% in the final months of 1953.

The report emphasized that it was watching complaints that government agencies are actively competing with private business in a number of fields. Much of the report focussed on the problem of small business people in obtaining military contracts, even when low bidder. Some charged American firms were allowed to bid on equipment not knowing that the procurement undoubtedly would be placed with a foreign concern. Answering such invitations cost American firms many thousands of dollars needlessly. Another procurement practice aired—wasteful practice of committing all budgeted funds during the last few weeks of the fiscal year to avoid reversions of those dollars to the treasury. Some companies reported that Ordnance red tape and general harassment made it almost impossible to meet production schedules.

Another interesting debate which involves the justice department had to do with nineteen rubber tire manufacturers and dealers who sought a legal showdown on the Quantity Limit Discount Ruling of the Federal Trade Commission. The ruling holds that one carload of 20,000 pounds is the maximum amount of tires and tubes on which manufacturers can give cash discounts.

Israel wants a large quantity of lathes, grinding machines, etc., for training schools Foreign Operations Adm. paying for equipment; purchasing done through Israel Supply Mission, Government of Israel, 250 West 57th Street, New York 19, N.Y., attention Daniel Kimhi. One lot includes twenty-three South Bend 10" precision lathes, eight South Bend 13" quick change precision lathes, and nine Tauco Toolmaker tool and cutter grinders No. 24-305 all with accessories and spare parts.

May, 1954

YOU PAY FOR THE BEST ... BE SURE YOU GET THE BEST

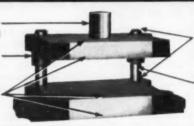
FACTORY-BUILT IS BETTER-BUILT

When you specify "Detroit" die sets, you are assured micro-metric precision that means: 1) Lower costs in mounting die in die set and 2) Longer, trouble-free production runs. Factory-built die sets give you what you pay for—parallelism, squareness and finish.

Shanks cast-on, inserted or welded

"Detroit" bushings

Parallel surfaces held to exceptionally close limits



Leader pin holes and bushing holes are micro-metric iia bored

"Detroit" precision leader pins are superfinished

Factory-built to the most exacting standards, "Detroit" die sets are also factory-assembled and factory-inspected. You don't have to re-work "Detroit" die sets in your shop to get the accuracy and performance you have a right to expect.

For prompt factory delivery, call "Detroit"

| DETROIT | TR 2-5150 | MINNEAPOLIS OR 5-7980 | |
|------------------|-----------|-------------------------|--|
| BIRMINGHAM, ALA. | . 3-1341 | MONTREAL, CAN GL 6126 | |
| BUFFALO | CI 0163 | NASHVILLE 6-2597 | |
| CHICAGO | PU 5-0500 | NEWARK MA 2-4318 | |
| CINCINNATI | HU 7775 | ORLANDO, FLA 2-3747 | |
| CLEVELAND | TO 1-0860 | PHILADELPHIA VI 4-4084 | |
| DALLAS | | PITTSBURGH LO 1-4011 | |
| DAYTON | HE 3042 | ROCK ISLAND, ILL 8-2814 | |
| DENVER | | ST. LOUIS FR 1-6810 | |
| INDIANAPOLIS | | SEATTLE EL 1454 | |
| LOS ANGELES | AD 7251 | TOLEDO MA 4510 | |
| MILWAUKEE | GL 3-7170 | TORONTO, CAN KE 2972 | |

DETROIT DIE SET CORPORATION

2895 W. GRAND BLVD. . DETROIT 2, MICH.



Air Force is selling approx. 300 surplus machine tools, Storage Site No. 6, Marietta, Ga.; tools claimed obsolete: lathes, grinding machines, milling machines and miscellaneous production equipment.

Recently SBA and Air Force established procedures which call for utilization of SBA regional and branch offices publicized for the benefit of the nation's small business opportunities available in the principal sales of surplus equipment and materials. Similar arrangements with Army, Navy, in line with recommendations by Congress.

More flexible allowances for the depreciation of machinery and equipment advocated as spur to business, agriculture purchasing. The incentive from recovering major part of investment in the early years of the life of assets could result in: A wave of orders for new equipment; better products at lower costs available to more employed; shortening replacement cycle, maintaining higher production; security strengthened by keeping plants modern, efficient; small manufacturers and farmers benefitting particularly; making possible report of true income, eliminating taxation of capital in form of fictitious profits which occur under present depreciation rates.

The Excise Tax Reduction Act of 1954 was adopted by a vote of 76 to 8. Generally speaking the Senate concurred in House provisions which dropped to 10% all rates presently above that level to take effect on April 1, 1954. Certain imposts above the 10% were retained such as taxes on dues, initiation fees, cabarets and fire arms. On the other hand tickets costing less than 60ϕ admitting to high school and college athletic events, theaters, and museums, were completely exempted. By a vote of 64 to 23 the Senate approved a cut on the tax on household appliances from 10% to 5%. Both Houses continued the taxes on liquors, tobacco, gasoline and automobiles. There is some talk that the President, who is irked by the tax repeal action, may give it a veto. It would certainly be extremely unpopular.

The House, late in March, passed a bill which extends an exemption of \$1200 on retirement income of school teachers, policemen, firemen and other retired persons. Under the present law a taxpayer cannot claim an exemption for a child who earns over \$600 a year. This bill modifies this provision by providing that if a child is under 18 years old, or if a student and over that age and earns \$600 a year, or more he may be claimed as an exemption, as long as the taxpayer contributes 50% or more to his support.

The new tax also allows a larger deduction for medical and dental expenses. It permits the deduction of expense for child care up to \$600 for widows, widowers and mothers whose husbands are mentally or physically defective. This provision is also designed to include divorced persons who are required to be gainfully employed to support their children. Also the law will allow farmers to deduct up to 25% of their farm income for expenses incurred for soil and water conservation, including leveling, grading, terracing, contouring and many other practices. It is believed that this provision will go far to

May, 1954

Now.,

A LANDIS THREAD ROLLING MACHINE

the LAN-HY-ROL, generating external threads by the chipless cold-forming process, offers important improvements in production economy and thread finish. This machine is being built under an exclusive beense agreement with Pee-Wee Maschipen and Apparatchau of Berlin, Germany, manufacturers of the world-famed Pee-Wee Thread Roller.

The new LAN-HY-ROL offers the same outstanding combination of precision, productivity, and flexibility which has made the German Pee-Wee Thread Roller unequalled in its field. We will share engineering knowledge and experience with Pee-Wee, and jointly conduct an extensive program of research and development. Significant improvements will be incorporated in the LAN-HY-ROL, comparable to those which have made other LANDIS Equipment outstanding in Thread Cutting, Thread Grinding, and Thread Tapping.

The new LAN-HY-ROL is another forward step in more than 50 years of LANDIS history, during which we have been continuously offering more efficient methods of generating screw threads.

The World's

Largest Manufacturers of Threading Equipment - Cutting - Tapping - Grinding - Rolling



LANDIS *Machine* Company

stimulate and encourage more soil conservation. The House passed the bill by a vote of 339 to 80. It is curious that George Meany, AFL pres., urged all members to ask their congressmen to recommit the tax bill. He thinks that the relief for the workers is not sufficient.

Many small users of nickel have urged the government to reimpose controls. Nickel, and other controlled metals and materials, are under the direction of the Office of Defense Mobilization. Its director, Arthur S. Fleming, said: "As a general principle I do not think re-establishment of controls is desirable..." Decontrol of nickel was adopted on November 1, 1953, with full recognition of the fact that after providing for defense needs the supply would be inadequate for all civilian requirements. It was believed by the Government agencies concerned and by major elements of industry at that time that continuation of controls would not serve to relieve or assuage the dislocation and hardship which then existed. Therefore, until it can be shown that Government controls would bring benefit to the industry as a whole, we should avoid the stifling effects of this action.

Taxes—those who must go through the entire printed document are obliged to read 1,096 pages of quarto size book paper, much of it in small type. The draft was prepared by technicians on the staff of the Joint Committee on Internal Revenue Taxation, and treasury experts, and it is the first time since 1870 that Congress will go over the whole measure and review the details of what brings in Uncle Sam's revenue.

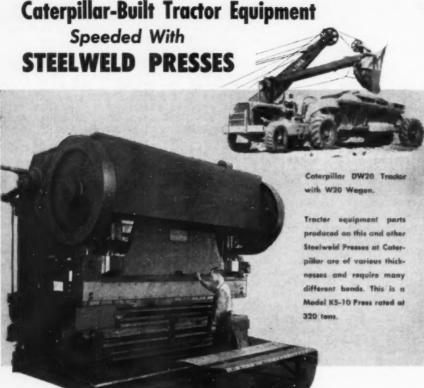
Two volumes of practical suggestions for machine and electric shop planning operations are listed in recent issues of the "Bibliography of Technical Reports" (BTR), published monthly by the U.S. Department of Commerce. Available from the Department's Office of Technical Services, these reports are reviewed briefly:

"STANDARD PRACTICE MANUAL; OUTSIDE MACHINE SHOP." Norfolk Naval Shipyard, Portsmouth, Virginia. 119 pages, with charts and forms. Available from the Office of Technical Services, U.S. Department of Commerce, Washington 25, D. C. (Commerce Building, Room 6227.) \$2.00. Code No. of Report, PB 111246. Basic machine shop operating procedures and position specifications for shop personnel are the subject of this report from the Outside Machine Shop of the Norfolk Naval Shipyard.

"SHOP PLANNING MANUAL; ELECTRIC SHOP." U. S. Naval Ship-yard, Charleston, S. C. September 1952. 59 pages, with charts and forms. Available from the Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. (Commerce Building, Room 6227.) \$1.00. Code No. of Report, PB 111245. A ready reference work to help electric shop planners in all phases of good shop planning, this manual shows how each job may be set up so as to eliminate waste effort in carrying it out. Based on actual operating experience at the Charleston Ship-yard, it describes and illustrates tested techniques which result in more efficient work control, better utilization of workers, and avoidance of lost time by work supervisor and planning shop because of incompletely planned jobs.

May, 1954

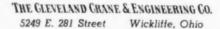




THE case and speed with which dies can be changed on Steelweld Presses and necessary adjustments made have proven a big asset in obtaining high production of a great variety of steel parts for scrapers, rippers, bulldozer blades and wagons at the Joliet Plant of Caterpillar Tractor Co.

Because of simplicity of Steelweld operation, the parts can be turned out quickly and accurately. The heavy quality construction, including solid one-piece frame, finest electrical equipment and automatic oilers for lubrication of all bearings, keep Steelweld Press maintenance extremely low and assure uninterrupted production.







EELWE

BRAKING . FORMING . BLANKING . DRAWING . CORRUGATING . PUNCHING

How's Business



Building Boom For '54

WASHINGTON . . . Commercial construction this year is due for a boost of at least 10 per cent above last year's peak of \$2.2 billion, the Chamber of Commerce of the United States reports.

All kinds of commercial construction will share in this happy trend. Capital outlay for office buildings, loft buildings and warehouses, as a group, can be expected to total 15 per cent greater than in 1953, while expenditures for stores, restaurants and garages are forecast to be at least 5 per cent more.

If to these main classes of commercial construction are added hotels, motels and commercial recreation buildings, the 1954 total will reach \$2.4 billion compared with the 1953 total of around \$2.2 billion.

Two spectacular features characterize the current boom: the lush expansion of office buildings and a great wave of shopping center construction. In New York City, nearly six million additional square feet of office space is under construction or in prospect. Pittsburgh, a pioneer in the new office building era, still has plans ahead. Boston, Philadelphia and Chicago are all busy with new structures, while construction is under way or planned in Baltimore, Washington, Atlanta, Dallas, Houston, Denver, Los Angeles, and San Francisco. Construction of shopping centers generally has been stimulated by the dispersion of new housing since the war together with the vast increase in autos in recent years.

Defense Against Recession

WASHINGTON... While "our national defenses against economic decline are strong—stronger than ever before," they can and should be strengthened, the Research and Policy Committee of the Committee for Economic Development said in a study made public recently.

While changes in our situation have "reduced the tendency of our economic system to multiply a deflationary impact... this does not guarantee that there will be no recessions, it does mean that what might have been a severe depression would be a moderate recession and what might have been a moderate recession can now be relatively mild."

The 50-page report, "Defense Against Recession: Policy for Greater Economic Stability," is a long-range appraisal of the country's ability to resist and recover from economic declines. This report was begun in the spring of 1953.

The Committee listed many factors tending to make the economy better able to overcome recessions today than it could in the past:

The country's financial position is stronger. Business and farm debts are lower, relative to assets and earnings. Private debt, notably mortgages, is on a longer term basis. The total of consumers' assets is large. Banks and other financial institutions, with the Federal Reserve System able to supply funds as needed and with a heavy proportion of deposits guaranteed, can keep credit channels open and encourage expansion.

Longer-term planning by business has increased.

Changes which have occurred in the Federal budget and other government programs since the Great Depression also will help to cushion declines, by sustaining consumer incomes and demand. Among these are unemployment compensation, social security, farm price supports and the fact that in a recession tax payments decline rapidly, thus helping to sustain private incomes.

The Committee reiterated its position that the cash budget should be balanced under conditions of high employment; it further believes that government operations would be severely restricted in a recession without some provision for an increase in the Federal debt limit.

The Committee suggests speedier income tax refunds, noting that in times of intermittent employment they would total much more than the normal \$2.5 billion a year; furthermore, business should be permitted to apply operating losses against profits of the two preceding years rather than one year as at present.

Government plans for emergency tax cuts should be made well in advance, "ordinarily the tax cut should take the form of an across-the-board cut in individual income tax rates," but there may be circumstances in which other tax cuts should be made as well.

The Administration should be given clear authority to adjust the terms of Federal Loans and loan guarantees to the needs of economic stabilization and coordinate them through a Federal Loan Council which would include the chief agencies involved.

The Committee said the possibility of error (in planning too little, too late) can be reduced by improving the quality of forecasts through broader surveys and faster reporting of business statistics as well as consumer and business spending plans.

"Individual businesses can make a greater contribution to stability than they have in the past. In part they can do this by doing better the things they already do well-such as developing new products to satisfy new wants, applying improved production methods to reduce costs and bring more products within reach of more people, and selling constructively." The Committee cautioned against automatic cuts in advertising and sales budgets if sales decline. Business "should appraise the possibilities that will exist for maintaining sales by redoubled effort in an economy where income and savings will still be large."

"To make a further contribution to stability, businessmen will have to do things they have not done so well in the past," principally by developing more stable inventory and capital investment policies.

Fluctuations in inventories and in



This is GORTON Pantography

Ready to Help You

Photo shows a standard P3-2 profiling ports in an aircraft part, a large aluminum-alloy casting. The sides of each port are parallel; one end has a true radius, the other end is para-

Standard P3-2 Pantagraph with special indexing knee fixture and automatic tooling.

bolic. A combination of other methods would do the cutting in hours, but the P3-2, with an automatic cutting cycle, finishes each port in 2.3 minutes.

Improve Production and Lower Costs

Gorton tracer-controlled equipment does efficient profiling, routing, die sinking, mold cutting, counterboring, chamfering, grooving, graduating, engraving and many other standard or special operations. You can expect high accuracy and high surface finish, whether your work involves metals or plastics in flat, uniformly curved, cylindrical or irregular shapes.

Enlarged templates, masters or patterns, all quickly and easily made, give Gorton Pantographs advantages of increased accuracy through reduction ratios. Work pieces range in size from the diameter of a dime to 10 feet. Cutting cycle is accom-

Fill out and mail the coupon for your copies of the Gorton catalog and the informative booklet, "Pantography."







1405 Racine St., Racine, Wis., U.S.A.

plished manually or automatically.

| Plea | se send | at | once | comp | lete | informa | ation | about |
|------|---------|------|-------|-------|------|----------|-------|-------|
| the | Gorton | line | conta | ained | in | Bulletin | 1655- | 1405. |

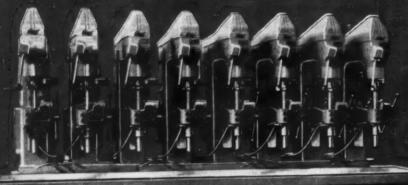
Address.

A 7786-1P-A

more parts...
more operations...
PER HOUR

avey

SUPER EIGHT SPINDLE No. 2 BMA-6 DRILLING MACHINE





for deliting ... to union ... production unadion

avey

Featuring power lift to table by push button control

- Hand Feed
- Power Feed
- Lead Screw Tapping
- Four Feeds
- Six Speeds
- · Built-in Coolant System

THE AVEY DRILLING MACHINE CO., Chalenatt t, Ohio

plant and equipment expenditures have been both cause and result of recessions. These could be moderated if businesses planned their investment programs with more attention to long-run growth prospects and less to short-run economic swings, and if more businesses avoided inventory speculation, holding their stocks to the minimum level needed for efficient operation.

Unstabilizing inventory practices would be greatly reduced if trade associations and government agencies would increase the flow of "more up-to-date and complete statistical information on inventories, sales and other subjects."

Expansion of unemployment compen-

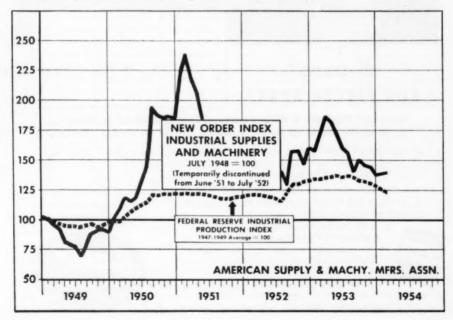
sation was among the Committee's suggestions for action by state and local governments.

State and local governments, as well as the Federal government, should expand their planning for public works projects which could be undertaken in an emergency. The Federal government was urged to offer loans for such planing and to prepare an advance program of credit support for actual construction by state and local governments.

Full text of the policy is available from the Committee for Economic Development, 444 Madison Ave., New York 22. N.Y.

PITTSBURGH... The new order index of industrial supplies and machinery has advanced for the second consecutive month. The American Supply & Machinery Manufacturers' Association reports the February order index as 140.5, a fractional point gain over January's 139.8. Until January the

index had declined almost uninterruptedly since March 1953, when a recent high of 188.2 was reached. The base month is July 1948. Therefore, the February order rate was more than 40 per cent above par. The index is based on orders received by association members.





Form and Duplicate a Wide Variety of Shapes in Metal as Heavy as 16 Gauge — Widths up to 24" — with Versatile DI-ACRO BRAKES

A number of forming jobs can be done with the Di-Acro Box Finger Brake by simply adjusting or changing the type of mounting bar on the contact surface. Di- Acro Finger Brake is:

- 1. A Box and Pan Brake-when equipped with a complete set of Box Fingers.
- An Open End Brake—when Open End Finger is installed in place of Box Fingers.
 - A Bar Folder—when an Acute Angle Bar replaces the Box Finger mounting.
 - A Standard Brake—when a Forming Bar is mounted for heavy operations.

WANT MORE INFORMATION? Send for 32-Page Catalog

O'NEIL-IRWIN MFG. CO. 314 8th Ave., Lake City, Minn.

*pronounzed Die-ack-ro Creators of "Die-Less Duplicating"

di-acro
PRECISION
METALWORKING
MACHINES

Must Create Demand at Retail Level

DETROIT . . . Current production activity, still at a high level, can be kept at a healthy pace only if demand is created at the retail level. Speaking to industrial suppliers attending Wayne University's Industrial Marketing Conference in Detroit, Ray P. Powers, vice president of manufacturing, Packard Motor Car Company, said that the creation of demand will bring about the correction of the present unbalance between distribution and production by early 1955.

The manufacturing official termed 1954 as a "turn-around" year when the high productive capacity of the dual economy—defense and civilian—must be gradually channeled into the civilian distribution. "In the auto industry, it has been so long since we had a normal year that with a return to the seasonal pattern some persons fail to recognize it." he said.

"The nation's distribution system was not ready when government production controls were lifted. Now, it must adjust to the largest and most efficient physical plant for production of goods in the nation's history. This is the result of 13 years of expansion at breakneck speeds when all the emphasis was on production to meet war or the threat of war," Powers said.

"Although the general pace of the economy has slipped somewhat from the peaks reached in the boom last spring, it is still on a high plateau in terms of production, consumption, income and savings," he said. "Chief problem in keeping it on a high level is in rebuilding marketing strength."

As the key group in meeting new production requirements, Powers called upon industrial suppliers for "aggressive action" to stimulate their own market with a three point program: (1) closer working relationships with customers

to find out what the manufacturing problems are and where costs can be reduced; (2) development of new products and services beyond those now supplied to industry; (3) a larger investment in research both to discover production problems and to find their solutions.

In further discussion, the auto executive warned that maintenance of steady employment and production will be determined by how vigorously business promotions and sales activities, as well as manufacturing cost reduction projects, are carried out.

Westinghouse Appliance Sales Up 5% In January and February

COLUMBUS... Sales of Westinghouse electric appliances were up 5% in January and February of this year over the same period last year, it was announced by John H. Ashbaugh, vice president, Westinghouse Electric Appliance Division.

Of special note, Mr. Ashbaugh said, was the fact that carload shipments of appliances directly to retailers increased 20% to 25% during this period over the same period last year. Sales of carload shipments to dealers are always made through distributors, but the appliances are shipped directly from the factory to the dealers.

With business conditions remaining reasonably the same throughout the remainder of the year, said Mr. Ashbaugh, sales of Westinghouse appliances during 1954 are expected to be 15% greater than sales in 1953, which was the best year in the history of the Westinghouse Electric Appliance Division.

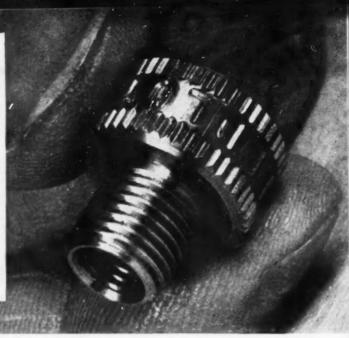
Business Good For Detrex

DETROIT . . . Business outlook for the balance of 1954 is "very encouraging," A. O. Thalacker, president of the Detrex Corporation, Detroit, said at the company's annual meeting of stockholders.

Under actual shop conditions the part shown at the right was produced in quantity on a Brown & Sharpe O. G. automatic. First the parts were produced from B1113. Then Ledloy from Ryerson stock was used. Here are the results:

MACHINING TIME

| B1113 | Ledley |
|--|---------|
| Seconds per part. 33 Hours per | 24 |
| 1000 pieces 13.15 | 9.57 |
| COST PER 1000 | PIECES |
| Set-up cost \$00.50 Muchine time and labor based | \$00.50 |
| on \$5 per hour 65.75 | 47.85 |
| Steel cost 7.92 | 9.03 |



\$16.79 saving on 1000 parts using Ledloy from Ryerson

In shops throughout the country Ledloy is effecting similar savings —establishing its superiority over all other free-machining steels.

\$57.38

On the average, this remarkable lead-lubricated steel brings net savings of 25% or more everywhere it is used by permitting much faster feeds and speeds (25 to 50% faster than B1113) and by extending tool

life as much as 200%. Still Ledloy retains the strength and other good qualities of an open hearth steel.

You can get quick shipment of Ledloy in any quantity from your nearby Ryerson plant. Rounds, squares and hexagons are immediately available in a wide range of sizes. We suggest you order a trial quantity now.

PRINCIPAL PRODUCTS: BARS, STRUCTURALS, PLATES, SHEETS, TUBING, ALLOY STEEL, STAINLESS, ETC.

RYERSON STEEL

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • PHILADELPHIA CHARLOTTE, N. C. • CINCINNATI • CLEVELAND • DETROIT • PITTSBURGH • BUFFALO • CHICAGO MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTLE

Chip Breakers

A condensation of a study sponsored by a group of machine tool builders under the auspices of the National Machine Tool Builders' Association.

TO OBTAIN the desired degree of chip breaking for a particular feed, two facts must be remembered: 1. Chip breaking depends upon the control of chip flow. 2. Chip flow control is accomplished by bending the chip. The same amount of bending produces the same degree of chip breaking. By changing the amount of bending, the degree of chip breaking is also changed.

With a given tool and chip breaker various degrees of chip breaking can be obtained by varying the feed. This, however, is not a satisfactory solution since the choice of feed should not be sacrificed to produce a certain type of chip. The chip breaker should be designed to operate satisfactorily with the feed that is prescribed for the job.

Chip Breaker Definitions

The following terms describing the chip breakers will be helpful in determining its dimensional characteristics, figure 1. From the cutting edge E, the face of the tool extends back to F. forming the floor of the chip breaker. The floor carries the cutting pressures from the chip. The rising part of the chip breaker from the floor F to the heel H is the slope. The slope lifts the free end of the chip up and over the heel each time a new cut starts. By the pressure from the heel the chip is bent into a circle, called the chip flow circle or circle of bending, which has a radius of bending B.

The size and location of this circle is determined by the location of the heel H relative to the floor EF or, in other words, by the width and height h of the chip breaker. Regardless of the

Note: This is an excerpt from a research report on "Chip Breaking," a study of three-dimensional chip flow. The research project which resulted in the publication of the booklet was jointly undertaken by a number of machine tool companies (under auspices of the National Machine Tool Builders' Association). A list of participating companies, as well as names of the steering committee, will be found at the conclusion of the article.

Copies of the report and of the wall chart may be secured from any of the sponsoring machine tool companies, or from the NMTBA, 10525 Carnegie Ave., Cleveland 6, Ohio. The booklet is 50 cents, the wall chart one dollar.

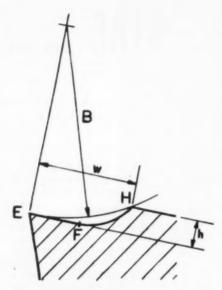


Fig. 1. Principal dimensions of chip breaker in cross section showing: Width:—w; Height:—h; Radius of bending:—B.



Fig. 2. Three chip breakers with same radius of bending and different widths and heights.

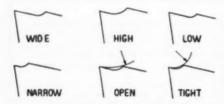


Fig. 3. Terms used to describe chip breakers.

width or height, if the radius of bending is the same, the chip will be broken in practically the same way, figure 2.

A wide chip breaker is one with a large width w; a narrow chip breaker has a small width w, figure 3. A high chip breaker has a large height h while a low one has a small height h. If the radius of bending B is large, the chip breaker is open. With a small radius of bending B, it is a tight chip breaker. An open chip breaker produces chips with an open curl, while a tight chip breaker will impose a tight curl on the chips.

It is now evident that the desired degree of chip breaking is obtained by the proper choice of the radius of bending **B** in the chip breaker. If the chip breaker produces a snarling chip instead of a well broken chip, it is too open. Its radius of bending **B** is too large, and it should be replaced by a tighter chip breaker, i.e., a chip breaker with a smaller radius of bending **B**. The relationship between radius of bending **B**, width **w**, and height **h** is shown in graph form in figures 4, 5 and 6.

Feed Ranges For Chip Breaking

The preferred range for one particular chip breaker or one particular radius of bending **B** is shown in figure 7. When the preferred range is determined for a number of chip breakers with different values of **B**, diagrams can be drawn as shown in figures 4, 5 and 6.

They represent the relationship between feed and radius of bending for the three materials AISI 4140, straight carbon steel, and AISI 112. The conversion of **B** to **w** and **h** is also given. From these charts one can determine the best chip breaker for a given feed, or the preferable range of feeds for a given chip breaker.

It is apparent from figures 4, 5 and 6 that the preferred range of feeds for a given chip breaker is narrow. Hence, two jobs requiring different feeds may

Fig. 4. Chart for chip breaker dimensions. Side-cutting-edge angle 0° —15°. Cutting speed 400-1000 fpm, Depth of cut .100"-.300".

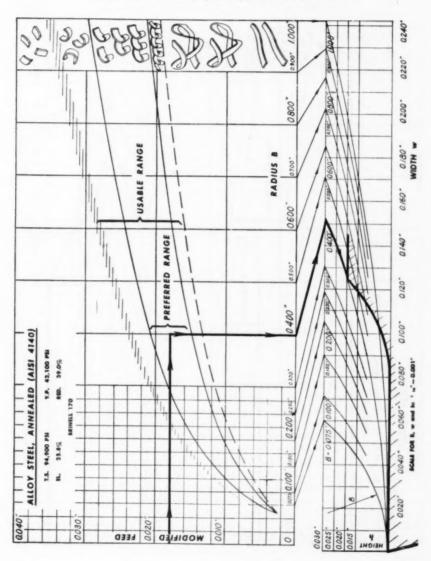


Fig. 5. Chart for chip breaker dimensions. Side-cutting-edge angle 0°-15°.

Cutting speed 400-1000 fpm. Depth of cut .100"-,300".

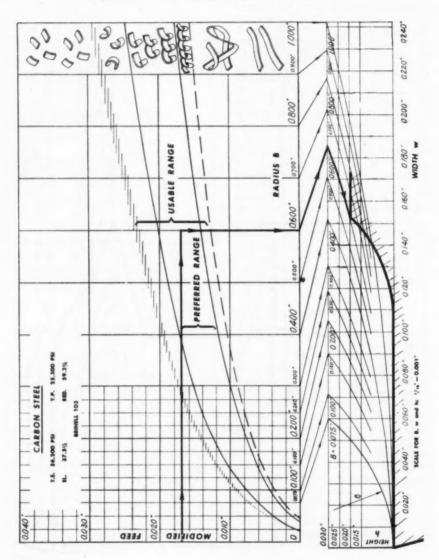
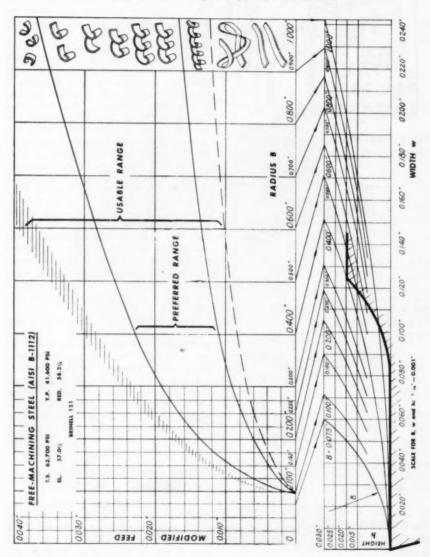


Fig. 6. Chart for chip breaker dimensions. Side-cutting-edge angle 0°-15°. Cutting speed 400-1000 fpm. Depth of cut .100"..300".



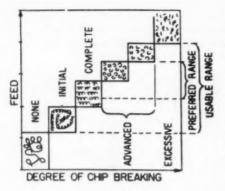


Fig. 7. Progression of chip breaking in relation to feed.

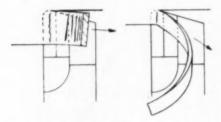


Fig. 8. Effect of a variation in depth of cut on direction of chip flow.

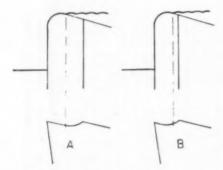


Fig. 9. Relation of floor and slope to cutting.
(A) Correct; (B) Incorrect-slope acts as gouge.

indicate different chip breakers. To keep within the preferred range, it may be necessary to design chip breakers for each job. This is not a disadvantage on production runs with special tooling, but it imposes a severe limitation on general purpose tools for short run jobs.

Since there is no publicly known method for widening the preferred range itself by changing the design of the chip breaker, the only solution is to accept some types of chips outside the preferred range. This is called the usable range. For this purpose the snarled chip is eliminated, and the lowest acceptable limit is initial chip breaking with its infinite helix, a controlled but unbroken chip. This may be an advantage in the case of the roller box turning tool where the continuous chip will not foul the rollers.

The upper limit of the usable range is determined by excessive chip breaking. For this purpose half turns are acceptable, but tight chips or splinters must be excluded to reduce tool breakage. The shorter tool life resulting from the use of half turns is not too serious for general purpose tools on short run jobs.

The dotted lines in figures 4, 5 and 6 indicate the usable range. It is one and one-half to two times the preferred range in size. The ideal solution would be a single all-purpose chip breaker, but this is not possible. In the average shop, however, two chip breakers will serve most purposes. One can be designed to cover the middle range of feeds, while the other spans either a heavy or fine range of feed, depending on the character of the production.

Cutting Conditions Affecting Chip Breaking

The chip breaking process is influenced more by feed than by any other cutting condition. The effect of a variation in the rake angle is so small that it can be ignored as long as the



EXACT HOLES ARE IMPERATIVE!

MAMILTON VARIMATIC B Super Sensitive Variable Speed Small Hale Precision Drilling Machine Are you fighting the never-ending battle of trying to produce exact holes on a
drilling machine which, itself, is not built to
precision tolerances? You are under no necessity
to do so. For the difference in price between the
cheapest bench type, small hole drilling machine and
the Hamilton Varimatic is reckoned in pennies per day.
And the Hamilton Varimatic (holes from .004" to %14" in

all drillable materials) is <u>super sensitive</u>. Provides speeds, <u>infinitely variable</u>, between 840 R.P.M. and 9300 R.P.M. Is built to <u>precision tolerances</u>, and with the stamina to <u>retain precision</u>.

Get prices and specifications without obligation
ASK FOR FREE BULLETIN 5408

Address The Hamilton Tool Company 826 South Ninth Street Hamilton, Ohio

Hamilton Tool

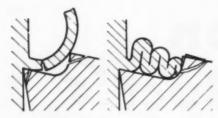


Fig. 10. Overbreaking, crowding, and tool breakage caused by too steep a slope.

rake angle remains within conventional limits. A variation in the side-cutting-edge angle (lead angle) changes the thickness of the cut and therefore has the same effect as a variation in the feed. Table 1 gives values for converting the actual feed to a modified feed for different values of the side-cutting-edge angle. These modified feed values must be used with figures 4, 5 and 6 when selecting the desired chip breaker.

The speed level of 400-500 fpm is the most critical. From this value to 1000 fpm there is little change in the chip breaking. Thus, if the chip breaker is effective at 400-500 fpm, it will break the chip at any other cutting speed and becomes more effective at reduced speeds. From the speed range of 200-300 fpm and 300-400 fpm, Table 2 gives the

modified feeds that are needed in conjunction with figures 4, 5 and 6.

A variation in the depth of cut influences the direction of chip flow across the tool. With heavy cuts the chip flows at right angles to the cutting edge and meets the slope of the chip breaker squarely. At light depths of cut the chip is deflected from the workpiece and meets the slope of the chip breaker obliquely, figure 8. The bending effect of the chip breaker is decreased, and the chip has a tendency to slide off rather than break. Table 3 gives the conversion from actual feeds to modified feeds for use with figures 4, 5 and 6.

In grinding a chip breaker the basic requirement is the correct radius of bending **B**. As shown in figure 2, this can be accomplished in many ways by using different values of **h** and determining **w** accordingly. Usually it is wise to keep the size of the chip breaker as small as possible in order to reduce the amount of grinding and to save tool and grinding wheel material. On the other hand, a large chip breaker will wear longer than a small one and generally improve tool life.

A lower limit to chip breaker dimensions is determined by the fact that the cutting should be done by the floor of the chip breaker and not by the slope, figure 9. The slope does not present

Table 1. Modified feeds—to be used with various side-cutting-edge angles SCEA (lead angles).

| Actual Feed, inch per revolution | .005 | .010 | .015 | .020 | .025 | .030 |
|----------------------------------|------|------|------|------|------|------|
| Modified Feed for 30 degree SCEA | .004 | .009 | .013 | .018 | .022 | .026 |
| Modified Feed for 45 degree SCEA | .004 | .008 | .011 | .015 | .019 | .023 |
| Modified Feed for 60 degree SCEA | .003 | .006 | .008 | .011 | .014 | .017 |

SHORT RUNS PRECISION



Short runs of small, fine pitch, precision gears (gears up to 6" O.D. of the gear blank) carry high unit costs largely because of the top-heavy machine set-up time as compared to total production time. You can beat the machine set-up problem by routing small precision gear jobs to Hamilton Precision Gear Hobbers ... for:

"Hamilton Precision Gear Hobbers feature independent selection of speed, feed, and indexing; reducing machine set-up time and offering a selection of cutting speeds and feeds to sult (exactly) the material being worked."

you buy small quantities of precision gears, tell the man to "put your job on a Hamilton." You stand to profit two ways!

WANT FACTS

Write for Hamilton Bulletin No. 5409. Address: The Hamilton Tool Company, 826 South Ninth Street, Hamilton, Ohio



Hamilton Tool
USE IT WITH CONFIDENCE

Table 2. Modified feeds—to be used with various cutting speed ranges.

| Actual Feed, inch per revolution | .005 | .010 | .015 | .020 | .025 | .030 |
|----------------------------------|------|------|------|------|------|------|
| Modified Feed for 200-300 FPM | .006 | .011 | .017 | .022 | .028 | .033 |
| Modified Feed for 300-400 FPM | .005 | .010 | .016 | .021 | .026 | .031 |

Table 3. Modified feeds-to be used with various depths of cut.

| Actual Feed, inch per revolution | .005 | .010 | .015 | .020 | .025 | .030 |
|---|------|------|------|------|------|------|
| Modified Feed for .060-,100 inch Depth of Cut | .004 | .008 | .012 | .015 | .019 | .023 |
| Modified Feed for .300750 inch Depth of Cut | .004 | .009 | .013 | .017 | .022 | .026 |

the correct angles for the cutting, and if used in this manner it wears rapidly.

A very important factor in good chip breaker performance and satisfactory tool life is the shape of the slope. As explained, the slope is the rising portion of the chip breaker which connects the floor with the heel and guides the free end of the chip over the heel at the beginning of a new cut. A large heel angle results in smoother chip flow with less pressure and friction as the chip passes over the heel H. A satisfactory range for the heel angle is between 35 and 50 degrees. Above this limit the chip breaker is too flat; below it, the chip breaker becomes loaded with scrappings from the chip. With small heel angles (steep slopes), it is possible to get an overbroken chip by a crowded chip breaker, figure 10; either case leads to immediate tool failure.

There are other causes of tool damage. Overbroken and tight chips will damage the cutting section of the edge. A curled chip striking the edge will damage the edge a little behind the cutting section. A very regular, cylindrical, closed curl is often an indication of the beginning of cratering.

Chip Breaker Dimensions

Generally, the overall size of a chip breaker should be selected in proportion to the size of the tool itself. For tools with a shank less than ¾" high a chip breaker height of .015"-.020" is recommended. Tools from ¾" to ¾" high should have chip breaker heights of .020"-.025", and tools larger than ½" should have .025"-.030" chip breaker heights.

In grinding the chip breaker, a fillet radius equal to the radius on the edge of the grinding wheel is produced. To avoid misunderstanding, it should be realized that the fillet radius **R** is not the same as the radius of bending **B**.

When the smallest possible chip breaker is desired, a height of .015" is recommended, with a fillet radius on the wheel of .035". Wear on the grinding wheel may increase the fillet radius

do you WASTE MOMEY RISK ACCIDENT doing things the HARD WAY?

your plant today and note how many assembly and maintenance operations are being done in awkward or tiresome positions



Imagine THEM BEING DONE ON

THE HANDY HAMILTON PORTABLE ELEVATING TABLE

With Portelvator hundreds of assembly and maintenance jobs are accomplished at the right height and in the best light And that means money in the bank and workmen on the job; faster work and fewer accidents

Portelvator prices start at \$155.00place a couple at your workmen's disposal and watch results.

description in FREE Bulletin No. P-5403.

WRITE FOR IT!

Address The Hamilton Tool Company, 826 South Ninth Street, Hamilton, Ohio

IT'S A

WITH CONFIDENCE

Table 4. Recommended fillet radii in relation to height of chip breaker (in inches).

| h | 0.015 | 0.020 | 0.025 | 0.030 |
|------------------|-------|-------|-------|-------|
| R _{Min} | 0.035 | 0.050 | 0.060 | 0.070 |
| R _{Max} | 0.065 | 0.085 | 0.100 | 0.125 |

to .065" without exceeding the upper limit of the heel angle. For large chip breakers the height recommended is .025"-.030", and the fillet radius should not be less than .060"-.070" nor exceed .100"-.125", see also Table 4. It is not desirable to dress the grinding wheel to a sharp corner; thus material is saved. The tolerances recommended for the principal chip breaker dimensions are plus or minus .002" for h and plus or minus .004" for w. Such tolerances present no difficulty in the grinding operation.

The End

This research project was conducted at the Sibley School of Mechanical Engineering of Cornell University at Ithaca, N.Y., by Professor Erik K. Henriksen of the Department of Materials Processing, under the general supervision of Director Harry J. Loberg of the College of Engineering. Professor Henriksen is presently associated with the Department of Mechanical Engineering, College of Engineering, University of Missouri, Columbia, Mo.

The Steering Committee directly responsible for the research work consisted of the following:

James C. Hebert, Chairman

General Sales Manager, Jones & Lamson Machine Co., Springfield, Vermont

Frank U. Hayes, Vice President
The Bullard Company, Bridgeport,
Connecticut

J. Herbert Myers, Vice President

The Lodge & Shipley Company, Cincinnati, Ohio

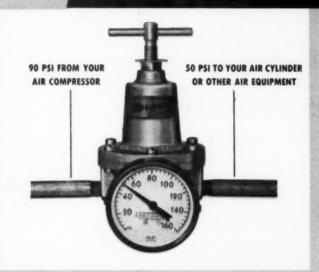
Stanley A. Brandenburg, Vice President, The Monarch Machine Tool Company, Sidney, Ohio

Donald M. Pattison, Vice President The Warner & Swasey Company, Cleveland, Ohio

Harold R. LeBlond, President
The Cleveland Automatic Machine
Company, Cincinnati, Ohio

The following machine tool companies, in addition to those represented on the Steering Committee, participated in defraving the cost of the research project: American Steel Foundries-King Machine Tool Div.: American Tool Works Company; Axelson Manufacturing Company: Baldwin-Lima-Hamilton Corporation-Niles Tool Works Div.; Cincinnati Lathe & Tool Company; Consolidated Machine Tool Corp.; Giddings & Lewis Machine Tool Co.; Gisholt Machine Company: George Gorton Machine Company: Greenlee Bros. & Co.; Hendey Machine Company, Inc.; R. K. LeBlond Machine Tool Co.; Lipe-Rollway Corporation; Oster Manufacturing Company; Potter & Johnston Co., Div. of Niles-Bement-Pond Co.,; Pratt & Whitney, Division of Niles-Bement-Pond Co.; Seneca Falls Machine Company; Sidney Machine Tool Company; Springfield Machine Tool Company; Sundstrand Machine Tool Company; Wickes Brothers, Div. of The Wickes Corp.

Why waste compressed air at 90 psi where 50 psi will do a better job ?...



...and

- reduce wear on air equipment
- · save dollars on air costs

USE NORGREN PRESSURE REGULATORS

Norgren Regulators more than pay for themselves in savings in air costs alone. More important—they accurately control air pressures to assure proper operation of equipment and minimum maintenance costs. Available in wide range of remote control, low pressure, relieving and cylinder gas types.

WRITE FOR NEW CATALOG No. 600



PIONEER AND LEADER IN OIL-FOG LUBRICATION FOR 26 YEARS

ANOTHER IDEA FOR CUTTING AIR COSTS



A blow gun with 90 psi line pressure uses 10½ cfm of air. 30 psi usually does the job just as well and uses only. 4½ cfm... saving 6 cfm every minute—on one gun used an average of one hour per day the saving would be 90,000 cu. ft. of air per year.

VALVES . FILTERS . REGULATORS . LUBRICATORS . HOSE ASSEMBLIES

Increase Bending Speed From 288 to 456 Pieces Per Hour

THE ACME-LEES Div., The Serrick Corp., Muncie, Ind., produces high-quality bends at outstanding production speeds. This large commercial fabricating shop specializes in the forming of decorative trim strips, moldings, and similar items for the appliance field.

The Acme-Lees people handle a wide range of work on two size 34 Pines automatic benders. The bender in the foreground of figure 1 is compressionbending stainless steel (type 430) molding which is .020" thick, making bends on a 11/2" radius. The completed pieces measure 2434" x 29-1/32". The hand bender setup which was originally used produced only 288 bends per hour. Now the job averages 456 bends per hour using high-production automatic units. Output is necessarily reduced to a certain extent because the rolled form of the workpiece requires very careful positioning in the bending dies to avoid marring the finish of the stock. An Ampco bronze wiper shoe is also used to prevent scoring the smooth surface during the bending operation.

Unique Stop Arrangement

Production bending requirements dictate the use of a rapid, yet accurate method of locating the workpieces to obtain the precise duplication of finished pieces required for ease in assembling on the finished product. In this instance, a system of stops, figure 2, located on the swinging arm and on the top of the bender, quickly determine the correct distances required to make the bends. The swinging stop on the bender arm locates the first and fourth bends, and can be tipped out of the way to permit the second and third bends to be located from the stops on top of the unit. A close-up of the tooling area, figure 3, shows the small swinging stop, as well as the details of the tooling used on the job.

The second bender in the department, figure 4, is shown draw-bending .032"

brass trim molding, making two 1%" radius bends to 85°, and averaging 282 bends per hour. Three different sizes of moldings, all requiring bends of equal radii, are handled with the same set of

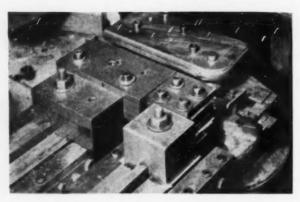
dies by simply adjusting the distance between bends, thus lowering production costs for these jobs. The finished pieces, which are later chrome-plated, measure 373/4" x 6 9/16", 30" x 4 9/32",



1. The bending department of the Acme-Lees Div. of the Serrick Corp., Muncie, Ind., major fabricators of trim strips and moldings for the appliance industry. Two Pines size 3/4 benders, shown in operation above, handle the widely varying bending requirements in this division.

2. Bending stainless steel strips for a well-known washing machine involves making bends on a 1½" radius. In this operation, the first and fourth bends are located with the aid of a hinged stop mounted on the swinging arm; second and third bends from stops mounted on top of machine.

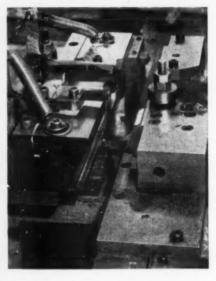




3. Closeup of tooling used for bending stainless steel trim strips. The hinged stop is clearly visible at the right of the photograph. When raised, it gauges distance for making first and fourth bends; lowered, it allows workpiece to clear for making second and third bends.



4. The machine above is draw-bending .032" brass trim molding, making two bends to 85 degrees on a 1%" inside radius. Rubber bumpers, shown in raised position, are used to protect the finish of the workpiece from being marred during the loading operations.



5. Closeup of the rubber bumpers. Attached to spring-loaded levers which are chained to the rear of the slide housing, they are automatically raised clear of the tooling area as the clamp and bending dies close. Tooling on this job also includes a cam-actuated stock ejector pin and a wiper die.



Tooling <u>simplified</u>.. output <u>up</u>..drill <u>costs down</u>..

with exceptionally versatile Dumore Automatic Drill Heads

TO mass-produce a variety of small holes in connector plugs, Cannon Electric Mfg. Co. of Los Angeles bought 16 Automatic Drill Heads. These Drill Heads are being used in multiple-head setups of four, six or eight heads per unit.

In one six-head, radially-mounted setup, production was upped 100%. On another job where all 16 heads were set up in four-head units, production was tripled. Cannon's chief production engineer says, "We're very pleased. Dumores increased production, cut drill breakage and simplified our tooling."

If you're interested in similar all-around production, cost and tooling benefits — see your Industrial Distributor or write:



DUMORE PRECISION TOOLS

1335 Seventeenth Street • Milwaukee, Wis.



ABOUT THE PICTURES ABOVE

TOP PHOTO -PRODUCTION UP 100%

This operation involves drilling 0.1285" through holes to a maximum of 3/16" in die-cast aluminum connector plug. Previous production, 200 pieces per hour—with Dumore's it's up to 600.

BOTTOM PHOTO - OUTPUT TRIPLED

Here the Dumores are mounted in setups of four heads each. They're producing No. 49 to No. 18 holes to a depth of %16". Dumores have tripled hourly output!

Builders of a precision line of Tool Post Grinders, Hand Grinders, Drill Grinders, Automatic Drill Heads, Light Drilling Equipment, Flexible Shaft Tools, Quills, F/hp Electric Motors and Gear-motors.

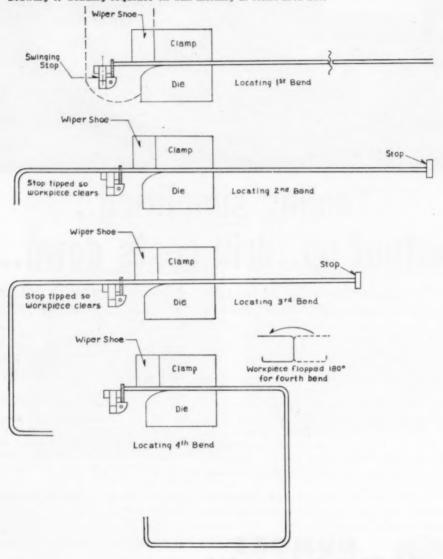
and 24%" x 4 9/32" in overall dimensions.

Bumper Setup Protects Finish

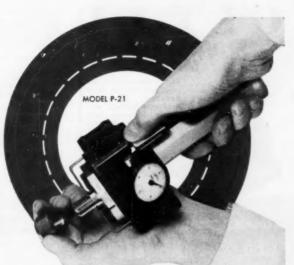
In the second bender setup a unique

system of rubber bumpers, figure 5, has been designed to protect the workpieces from being nicked or scratched during the loading operation. This

Drawing 1. Bending sequence on trim molding at Acme-Lees Div.



BRYANT GAGE FOR INTERNAL THREADS



The P-21 is a portable comparator gage. Variation from basic size of pitch diameter, form and lead are shown in a single reading on the dial indicator accurate to .0005". Interchangeable pairs of segments inspect all classes of threads in a range from 5 16" to 5" diameter.

The gage segments work on the principle of an expanding master plug. A thumb lever collapses one segment so that the part can be loaded. When the lever is released the segments engage the thread. The movement of one segment registers on a precision dial indicator which shows the accumulated amount of variation from basic size. The segments are made to the same tolerances in P. D., form and lead as a class "W" master. The segments are attached by four screws. Periodically the segments are checked to a master ring gage and the "0" setting of the indicator is adjusted accordingly. Worn segments may be returned to the factory to be reground. Dirt or cutting oil cannot affect the working parts of the gage as there are no slides or pivots. The indicator may be turned on the axis of the stem to keep the dial visible. This gage weighs only 16 oz. without the segments.

This gage is designed for use at the inspection bench or in the shop. It is used for quality control since complete control of the thread cutting process is possible. The indicator reading of variation from basic size tells exactly where within limits the work is running. For this reason also, the gage is used for checking tool wear in production jobs.

Please send descriptive literature covering the P-21 gage and other Bryant gages.

A bench type gage for external or internal threads is available, with or without squareness-of-face attachment.



BRYANT

CHUCKING GRINDER CO. Springfield, Vermont, U. S. A.

MAIL THE COUPON TODAY!

BRYANT CHUCKING GRINDER CO., SPRINGFIELD, VT.

Please send me illustrated folders giving full information on the Bryant Portable and Bench Thread Gages.

NAME_____TITLE____

COMPANY

STREET

Y_____STATE___

CLEAR



T. SCHMIDT, INC. 1804 W. BELLE PLAINE AVE. CHICAGO - 13 - ILLINOIS simple, yet effective, method substantially steps up production by reducing the length of the loading time which would otherwise be required to avoid damaging the fine finish. The bumpers are attached to spring-loaded levers which are connected by lengths of chain to the rear of the slide housing. As the clamping and bending dies move forward to close on the workpiece, the bumpers are automatically raised clear of the work area. At the end of the bending cycle, when the dies are opened, the bumpers spring back into position for the next loading operation.

Another feature of the tooling not readily visible in the photograph is a cam-actuated stock ejector pin for automatically freeing the workpiece from the die after the bend is made . . . thus stepping up production by reducing unloading time. A wiper die is also employed to insure smooth, uniform bends in the light material.

The End

SPEED UP YOUR GRINDING SET-UPS MAGNETIC CHUCK PARALLELS ."4V" BLOCKS



| | Matched | | 1 | Matched |
|-------|----------------|------------------------------|-----------------|--|
| Size | Pair | No. | Size | Pair |
| 1x2x2 | \$16.50 | IV2 | 1%x21/2x2 | \$22.50 |
| 1x2x3 | 19.50 | IV3 | 1%x21/2x3 | 33.75 |
| 1x2x4 | 22.50 | IV4 | 13/4 x 21/2 x 4 | 45.00 |
| | 1x2x2 1x2x3 | 1x2x2 \$16.50 1x2x3 19.50 | 1x2x2 | 1x2x2 \$16.50 IV2 1¾x2½x2 1x2x3 19.50 IV3 1¾x2½x3 |

Depth



Price includes Hardwood Box. 44V11 BLOCKS FEATURES OF PARALLELS &

1. "V" in "V" block ground parallel to base and centered.

Spring-temper, phosphorous bronze non-magnetic laminations.

Positive, mechanical lock, non-shift lamina-tions. Patent pending.

4. Dowels welded to end plates.

5. End plates ground square.

6. Five hard temper silicon bronze dowels.

7. 1/8" end plates welded and ground square.

PATENT PENDING

Ground parallel and square

PRECISION EXACTNESS AND HIGHEST QUALITY

P.O. BOX 6715 8205 Clinton Road Cleveland Ohio

Distributed Nationally by GROVER-SAYLE

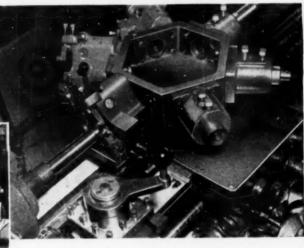


take shaft jobs Like This:

they take less time on GISHOLT TURRET LATHES

Yes, even in lots as small as 5 or 10 parts, you can't beat turret lathes on this kind of work. Parts are machined complete in 2 operations total time is less than 4 min.





no extra equipment needed!

THE GISHOLT ROUND TABLE represents the collective experience of specialists in the machining, surface finishing and balancing of round and partly round the parts. Your

problems are welcomed here.



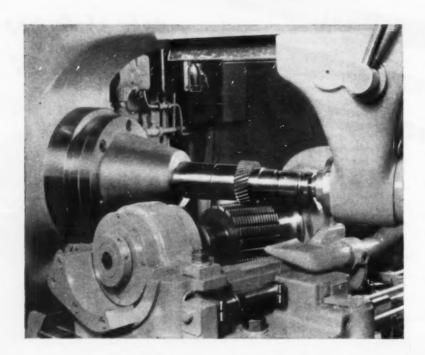
TURRET LATHES - AUTOMATIC LATHES
SUPERFINISHERS - BALANCERS
SPECIAL MACHINES

With no more than your standard bar equipment, you're all set to cut machining costs on shafts like these. No previous operations... such as cutting to length or centering... are necessary. And with two or more tools from turret and side carriage, you have the basic advantage of turret lathe economy—the time saving that means lower costs.

Before you turn to extra equipment or special attachments, look into the possibilities of doing the job the quick and easy way on Gisholt Turret Lathes. Gisholt engineers will gladly help you.

GISHOLT MACHINE COMPANY

MADISON 10. WISCONSIN.



HIGH-SPEED HOBBING

INCREASES PRODUCTION AND TOOL LIFE

The Barber-Colman No. 14-15 Hydraulic Hobbing Machine is being used in several plants for hobbing of steel gears at speeds of approximately 300 SFM with an increase in both production and tool life. Although these speeds have not been considered practical until recently, the size, power and rigidity of the No. 14-15 Machine make it ideal for high-speed hobbing. Even with a standard hob slide, speeds of 300 SFM with a 5" hob are possible. However, most machines for high-speed hobbing are equipped with special heavy-duty, high-speed hob swivel.

The high-speed hob swivel is capable of speeds up to 950 RPM and is designed to accommodate hobs up to 7" diameter. The extra size and weight of this swivel provide the rigidity to maintain accuracy at high speeds. It is equipped with super-precision ball or tapered roller bearings. An automatic hob shifter may be furnished as extra equipment. High-speed hob swivels may be installed on recent machines in the field.

The jobs shown here indicate at least 200% increase in production, 100% better tool life, greater profile accuracy and equal or improved surface finish on the hobbed gears, hobbing at speeds of 300 SFM or greater. Using ground and unground hobs, gears were cut from a wide range of steels as high as 207 Br. hardness.

Although high-speed hobbing of steel gears is not used extensively as yet, it is used on enough jobs to prove that it is applicable under the proper conditions. Tests indicate that tool life increases until a speed of 200 SFM is reached, and then drops off rapidly to a speed of 250 SFM. After 250 SFM, however, hob life increases again until it is equivalent or better at 300 SFM than at 200 SFM. Materials on which satisfactory results have been produced include AISI 1113, 8620, 5135 and 4140. FIRST SERIES OF TESTS





| | GEAR | STANDARD HO | STANDARD HOB SWIVEL HIGH-SPEED HOB SWIVEL | | HOB SWIVEL HIGH-SPEED HOB SWIVEL % | | | % IN | CREASE |
|----|------------|----------------------------|---|----------------------------|------------------------------------|-------|--------------|------|--------|
| DP | No. Tooth | Cutting Time at 135 SFM | Pieces Per Shift | Cutting Time at 326 SFM | Pieces Per Shift | Prod. | Tool Life | | |
| 6 | 36 Spur | 10.64 min. | 72 | 4.2 min. | 161 | 253 % | 223% | | |
| 6 | 35 Spor | 11.62 min. | 72 | 4.5 min. | 151 | 258% | 209% | | |
| 8 | 55 Helical | 15.14 min. | 50 | 6.94 min. | 105 | 218% | 210% | | |
| 8 | 62 Helical | 26.8 min. | 28 | 10.3 min. | 72 | 260% | 257% | | |

Double Thread Hob, 5x5x2 Steel - AISI 8620 normalized

Feed - .060"/rev. No difference in surface quality Profile and lead angle above average accuracy

SECOND SERIES OF TESTS

| HOB Accurate Unground 9 D.P. 3-Thd. 5x5x2 | GEAR 22 Teeth, Helical SAE 5135 170-207 BHN | SPEED 307 SFM | .045"/rev. |
|---|---|------------------|------------|
| Some | Some | 307 SFM | .070"/rev. |

Climb Hobbing Material — AISI 5135

Average lead error — at .070" feed within .0006" in 13/16" Total Composite Error - .002" both feeds

Estimated Hob Life - 200 per sharpening

Using same speed and feeds with conventional hobbing, resulting finish was not as good.

Our Engineers have been working with our customers on high-speed hobbing and have helped to solve many problems. They will be glad to discuss the economy of high-speed hobbing to your specific job if you will submit your part print and production requirements to them.

Call your Barber-Colman representative or write direct to:

HOBS . CUTTERS . REAMERS HOBBING MACHINES HOB SHARPENING MACHINES



Barber-Colman Company

645 ROCK STREET SOCKFORD HILIMOIS

Fusion Welding Titanium

By Francis H. Sterenson

Aerojet-General Corporation Azusa, Calif.

CONTRARY to much that has been written and said, commercially pure titanium can be fusion welded without great difficulty. However, such work does require a careful selection of welding techniques.

The above assertions are made as the result of work done at Aerojet-General Corporation with TI-75A and RC-70 materials, which have an ultimate tensile strength range from 70,000 to 100,000 p.s.i. and a minimum elongation of 15% in 2" of gage length.

All welds were made by means of the inert gas shielded tungsten arc process with and without filler materials. Torches were mechanically and manually manipulated. Helium was used as the shielding gas when the welds were made mechanically because less amperage was needed and a narrower weld with full penetration could more easily be obtained than when argon was used. Argon was used when the welds were made manually because it is a "cooler" gas and therefore easier for the welder to use.

The welds were made under shop conditions with standard equipment, although some mechanically-made joints were given extra shielding by using a 3" extension on the gas cup. By means of this extension, all outside atmosphere was excluded, and a silver-bright finish was attained on top of the weld. When the underside of the weld was protected by a back-up bar, it also had a silver-bright surface.

Direct straight-polarity current and thoriated tungsten electrodes were satisfactorily employed in each circumstance.

The mechanical welds were all produced on a special fixture, which has a copper back-up bar with a groove 4" wide and .019" deep, since it was not necessary to use a gas back-up with a groove of the above dimensions. To find the most suitable size of groove, a series of tests were conducted with a series of back-ups, ranging from no groove to a groove 38" wide and 3/16" deep. When the larger grooves were used, an inert gas was introduced to provide shielding, back-up was considered to be adequate when the underside of the weld had a silver-bright surface.

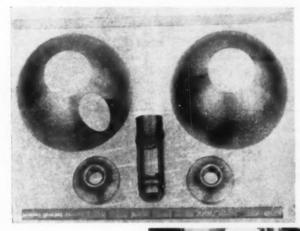
The groove which resulted most consistently in a silver-bright appearance of the underside of the weld was ¼" wide and .010" deep. Accordingly, all weld tests on flat sheet were made with this type of groove in the back-up bar.

A majority of welds were made on .063" thick stock since this material was most readily available.

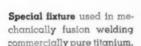
Test data on butt welds in .063" Ti-75A titanium sheet are summarized in tables I, II, and III. Fatigue tests were conducted on a group of specimens containing welds made manually and mechanically.

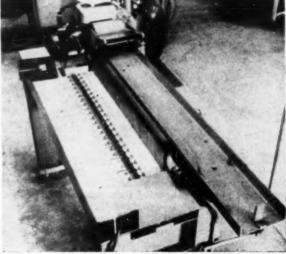
Tensile tests made transverse to the

direction of rolling gave mean values for annealed Ti-75A of 93.5 ksi ultimate strength, 78.8 ksi yield strength at 2% offset, and 23.5% elongation in 2". When the endurance limit was divided by the ultimate tensile strength, endurance ratios of .496, .406, and .367 were obtained for unwelded, machinewelded, and hand-welded specimens, respectively.



Titanium components of small spherical tank prior to welding.





| | EΝ |
|--|----|
| | |
| | |

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---------------------|--------|-------|--------|--------|--------|--------|--------|--------|--------|
| Filler wire | Ti-75A | None | None | Ti-75A | Ti-75A | None | None | None | None |
| Wire dia., in. | 0.062 | - | - | 0.062 | 0.062 | | ****** | _ | - |
| Current, dc, amp | 100 | 100 | 100 | 100 | 100 | 50 | 50 | 50 | 50 |
| Arc voltage | - | - | decome | Access | | 13 | 13 | 13 | 13 |
| Inert gas | Argon | Argon | Argon | Argon | Argon | Helium | Helium | Helium | Helium |
| Torch, cfh | 30 | 30 | 30 | 25 | 25 | 25 | 25 | 25 | 25 |
| Backup, cfh | 10 | 10 | 30 | 10 | None | 10 | 10 | 10 | 10 |
| Manual | X | | - | X | X | - | | _ | |
| Automatic | | X | X | - | - | X | X | X | X |
| Carriage | | | | | | | | | |
| speed, fpm | - | 20 | 18 | | - | 19 | 19 | 19 | 19 |
| | | | | | | | | | |

Note: Straight polarity, thoriated tungsten electrodes (1/16-in. dia.) used in all tests.

Table I. Welding data on inert-gas tungsten-arc butt welds in .063" Ti-75A Titanium



Fixture used in welding bosses and hemispheres of small spherical tanks comprising commercially pure titanium parts.

As expected, welded specimens had a greater degree of dispersion than unwelded specimens. In addition, machine welds exhibited greater fatigue strength and less scatter than manual welds; and both manually welded and machinewelded specimens had higher endurance limits than the unwelded specimens, probably because of strengthening due to oxygen absorption at the surfaces of the welded specimens.

Further proof that commercially pure

titanium is practical for production was obtained when four spherical tanks were designed and subsequently fabricated from 0.063" Ti-75A titanium sheet. Two of the tanks were welded manually, and two had mechanically made girth seams and boss welds. As indicated by accompanying photographs,

a fixture was used in welding the boss to the hemisphere. The boss was supported on a central post attached to the base plate of the fixture, and the hemisphere was held in place by an outside ring attached to a copper chill plate which minimized the heat-affected zone. Internal shielding was provided

Table II. Tensile-test data on weld joints for butt welds in .063" Ti-75A Titanium sheet.

| Specimen | Ultimate | Ultimate Strength | Elonge | gtion | Distance fro Weld to Fracture |
|----------------------|------------------------------|--------------------------------------|------------------------------|------------------------------|-------------------------------------|
| No. | Load. lb. | psi | in./2 in. | Percent | in. |
| 2A 2B 2C 2D | 2400 2500 2450 2450 | 76,200 75,800 74,900 74,900 | 0.33 0.33 0.33 0.35 | 16.5 16.5 16.5 17.5 | 0.65 0.70 0.85 0.75 |
| Av | - | 75,500 | - | 16.9 | |
| 3A 3B 3C 3D | 2450 2400 2450 2400 | 74,500 71,800 74,700 73,300 | 0.31 0.32 0.37 0.33 | 15.5 16.0 18.5 16.5 | 0.70 0.80 0.75 0.75 |
| Av | | 73,600 | - | 16.6 | Mount |
| 4A 4B 4C 4D | 2500 2500 2450 2450 | 77,600 81,000 75,900 76,000 | 0.34 0.33 0.33 0.31 | 17.0 16.5 16.5 15.5 | 0.65 0.75 0.80 0.75 |
| Av | | 77,600 | | 16.4 | _ |
| 5A 5B 5C 5D | 2510 2400 2400 2450 | 74,800 75,500 75,500 76,400 | 0.32 0.31 0.31 0.33 | 16.0 15.5 15.5 16.5 | 0.92 0.75 0.70 0.68 |
| Av | | 75,600 | - | 15.9 | _ |
| 6A 6B 6C 6D | 2100 2550 2600 2550 | 78,400 76,800 78,500 77,000 | 0.34 0.38 0.36 0.36 | 17.0 19.0 18.0 18.0 | 0.62 0.44 0.61 0.66 |
| Av | | 77,700 | | 18.0 | |
| 7A 7B 7C 7D | 2500 2550 2500 2450 | 74,400 76,000 74,200 72,500 | 0.33 0.34 0.33 0.32 | 16.5 17.0 16.5 16.0 | 0.70 0.65 0.65 0.70 |
| Av | | 74,300 | | 16.5 | |

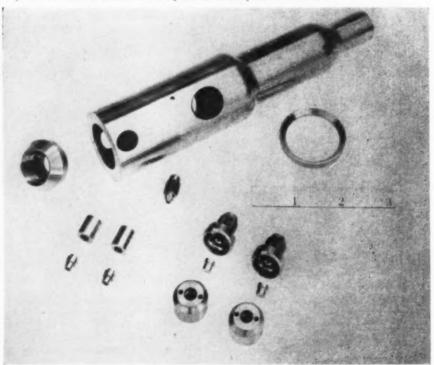
by introducing argon gas through a fitting in the base plate and allowing it to escape through a small slot in the center post at the point of contact with the boss.

Prior to welding, the inside of the hemisphere was purged with argon for a period of 5 minutes at a flow rate of 40 cu. ft. per minute. During welding, a flow of 10 cu. ft. per minute of argon was maintained inside the hemisphere, and a flow of 16 cu. ft. per minute through the torch. A 1/16" dia. thoriated tungsten electrode with a gas cup opening of 3/4" was used.

The effect of the copper chill plate mentioned above in minimizing the heat-affected zone was clearly indicated by a dark area just outside of each weld.

The four tanks were tested as follows: (a) Tank No. 1 was hydrostatically presgurized to 1200 p.s.i. without showing signs of leakage or deformation. The pressure was then reduced to 900 p.s.i. for 30 minutes, after which there was still no evidence of leakage. Pressure was next reduced to zero. Then the tank was repressurized to 2680 p.s.i. at a rate of 50 p.s.i. per minute. This caused the tank to burst. The failure apparently started at the line of fusion of the weld with the parent metal adjacent to the tube, and carried through the parent metal in two directions and across the girth weld in two places.

Titanium components of 50 lb, thrust rockets. These components were proved to be superior to welded stainless steel parts of a comparable nature.



(b) Tank No. 2 was pressurized in the same manner as Tank No. 1, and bursting occurred at 2760 p.s.i. The failure started at the line of fusion of the weld with the parent metal adjacent to the girth repair weld.

(c) Tank No. 3 was subjected to the same proof pressure (1200 p.s.i.) as Tanks 1 and 2. This caused a small crack to open at the boss weld. The crack was repaired three times. Each time, instead of the tank bursting, the crack opened. Because this occurred at 2700 p.s.i., testing was discontinued, as it was believed that further attempts to repair the crack would not result in additional information.

(d) Tank No. 4 was tested at the same pressures as the previous tanks. How-

ever, a crack opened at a pressure of 1060 p.s.i. at a point where an inadequate boss weld had been repaired. Test work was then discontinued.

Prior to pressure testing, Tanks 1 and 4 were stress-relieved at 1200° F. for 30 minutes, but no benefits were apparent. Since the average maximum burst pressure for the first three tanks was 2712 p.s.i., the test results were considered satisfactory.

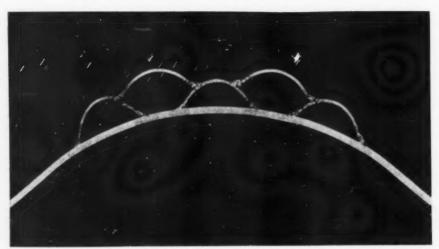
Parts for a 50-lb. thrust rocket, machined from commercially pure titanium bar stock, were also welded. The motor had been operated periodically for an accumulated time of 120 seconds, after which the only noticeable effect was a slight discoloration at the exit end. (An identical motor fabricated

Table III. Free-bend tests of inert-gas tungsten arc butt-weld joints* at 180° F. In. Ti-75A Titanium sheet.

| Specimen No. | Ratio of Bend Diameter to Sheet Thickness | Calculated Local Elongation, % | | |
|-----------------|---|--------------------------------------|--|--|
| 1A | 3 | 24 | | |
| 1B | 3 | 24 | | |
| 1C | 3 | 24 | | |
| 1D | 3 | 24 | | |
| 1E | 3 | 24 | | |
| 2A | 3 | 24 | | |
| 2B | 3 | 24 | | |
| 3A | 2 | 30 | | |
| 3B | 3 | 24 | | |
| 4A | 3** | 24 | | |
| 4B | 4** | 20 | | |
| 5A | 12** | 8 | | |
| 5B | 14** | 6 | | |
| 6A | 11/2 | . 37 | | |
| 6B | 2 | 30 | | |
| 7A | 2 | 30 | | |
| 7B | 2 | 30 | | |

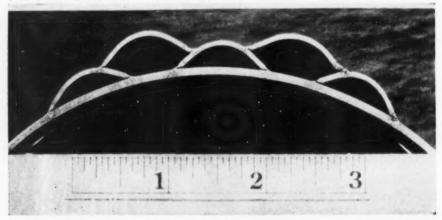
^{*}All-weld bead reinforcement was ground off; automatic welds were not ground. Bends are all face bends unless otherwise noted.

"Root bends.



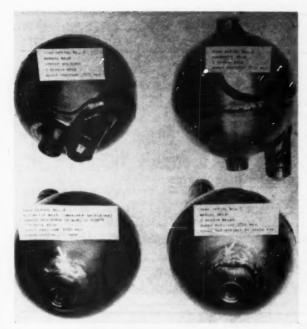
Formed sections, fusion welded with filler materials, were superior to weld assemblies made without fillers.

Formed titanium segments, fusion welded without filler material, had good physical properties despite poor penetration.



from Type 347 stainless steel was very noticeably eroded at the exit end following an identical test.)

Further tests were conducted with sheets formed in segments and then welded to each other and to a plate in order to check the material effects of a number of welds made close together. The ends of the test section were closed by a plate, to which small pressure fittings were welded so that any or all of the small chambers formed by the tubular segments could be pressurized. The welds in this section were made for comparison only, without the addition of any filler material. As expected,



Titanium test tanks after destructive test operations. The signs on the pressure vessels: (top left), tank serial No. 1: manual weld: stress relieved: 1 repair weld; burst pressure 26800 psi.; (top right), tank serial No. 2: automatic weld: 1 repair weld; burst pressure 2760 psi.; (bottom right), tank serial No. 3: manual weld; 3 repair welds; burst pressure 2700 psi.; crack not visible by naked eye; (bottom left), tank serial No. 4: automatic weld (improper shielding); stress relieved 30 min. at 1200 F.; 1 repair weld; burst pressure 1060 psi.; crack length .38 inch.

there was no penetration; but, despite this defect, the pressure required to cause failure was 1890 p.s.i.

Where a filler material was used in making welds of the latter type, the pressure required to cause failure was 2700 p.s.i.

A series of tests was made to compare the ductilities of weld joints made with standard, commercially pure titanium filler material (Ti-75A) with those of high-grade, commercially pure titanium material (RS-55). Resultant data are summarized in Table IV.

The RS-55 filler wire had a hard surface coating which was believed to be either some form of tale (used in drawing the wire) or oxidation (produced by the technique used to draw the wire). Most of this surface coating was removed by a hydrofluoric-nitric acid etch which left the surface of the wire very rough and pitted. However, no difficulty was encountered when us-

ing the wire in a wire feeder at the time of making the weld. Further tests are being conducted with this filler wire to determine what effect (if any) the surface condition of the wire has on the finished weld, since it was noted that failure in the majority of test specimens occurred in the sheet stock and not in the welds (indicating that the strength of the weld point was greater than that of the parent sheet stock).

Bend tests were made on the coupons with bends parallel to and on the weld joint. An average of three readings were taken for each coupon, and elongation in the weld joints made with a Ti-75A filler material, was greater and therefore superior to that obtained using RS-55. However, further tests must be made before definite conclusions can be drawn.

Some cup testing was performed on several weld specimens, and results to date have indicated that welds made in

| cour | PON SP | ECIMEN | | | | |
|---|--------|---------|-------|-------|-------|-------|
| | 1 | п | ш | IV | v | VI |
| Parent metal thickness, in 0. | 050 | 0.095 | 0.050 | 0.050 | 0.095 | 0.095 |
| Parent metal material RC | 2-70 | RC-70 | RC-70 | RC-70 | RC-70 | RC-70 |
| Filler wire material (1/16-in. dia) Ti- | 75A 7 | 1-75A | RS-55 | RS-55 | RS-55 | RS-55 |
| WELD M | ACHIN | E SETTI | NGS | | | |
| Current, amp | 90 | 150 | 110 | 110 | 240 | 290 |
| Voltage | 16 | - | 16.5 | 16 | 17 | 17.5 |
| Carriage rate, in./min | 22 | 17 | 21 | 18 | 16 | 16 |
| Wire rate, in./min | 21 | 21 | 21 | 21 | 24 | 26 |
| MECHAN | ICAL I | ROPER | TIES | | | |
| Yield str., ksi | 60.8* | 70.7 | 56.1 | 97.4 | 86.4 | 98.2 |
| Ult. str., ksl | 102.9* | 110.6 | 104.7 | 106.2 | 113.9 | 109.2 |
| Elong. in 2 in., % | 4.5* | 16.5 | 21.0 | 23.0 | 20.0 | 18.5 |
| Location of failure | Weld | Weld | Sheet | Sheet | Sheet | Sheet |
| BEND 1 | TEST P | ROPERT | IES | | | |
| Mean elong., % | 20 | 40 | 15 | 15 | 26 | 13 |

*Vise jaws slipped, preloading one side of the test coupon and making these values questionable.

Table IV. Welding techniques and properties of joints.

View of small spherical tank prior to destructive testing.



commercially pure titanium with a Ti-75A filler material are quite ductile.

When titanium rewelds were made over the entire length of a weld, to simulate repair welding, the joint still possessed surprisingly good tensile strength—approximately as much as the original weld. However, examination of the tensile specimens showed numerous small cracks in the heat-affected zone adjacent to the weld. The brittleness of this zone was confirmed by subsequent bending tests, in which the specimens failed almost immediately after the bend was started.

Brittleness was especially noticeable in specimens that had been subjected to three or more passes, indicating that repair-welding must be kept at a minimum. However, satisfactory results have been obtained by carefully grinding out the old weld and replacing it with new weld metal.

Conclusions we have reached as the result of our work with titanium can be briefly summarized as follows:

(1) Fusion welds can be made using standard, inert gas shielded, arc welding equipment if the weld is carefully shielded until it cools to approximately 400° F.

(2) Welding procedures must be devised to minimize the number of welds coming together at any one point.

(3) Helium is preferred as a shielding gas, when welds are made mechanically; argon, when welds are made manually.

(4) No benefit has been gained from the stress-relief of welded joints.

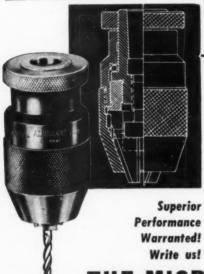


Volume 2

AMERICAN BUILT MACHINE TOOLS

Now Available

The second volume of American Built Machine Tools includes: Drilling, Grinding, Gear Making and Boring Machines, as well as the MAPI Replacement Formula. 450 pages of descriptions, articles and specifications of all models of machine tools. This is a supplement to Volume 1, published in 1952. Write: MACHINE and TOOL BLUE BOOK, 222 E. Willow Ave., Wheaton, III. Price: \$4.50.



The ALBRECHT DRILL CHUCK

PERFORMANCE IS THE PAYOFF!

. . . and from jig borer to line press, the ALBRECHT chuck outperforms the field . . . pays off in drills, time, precision.

- Drill life doubled . . . Albrecht ends drill slippage and scored shanks, drills last twice as long.
- Reliable hand operation at all times
 ... The never-freeze ALBRECHT makes
 hand clamping and release routine.
- Unmatched accuracy sustained . . . conventional drill chuck runout a thing of the past!

THE MICROTRUE COMPANY

149 Church Street

Tel.: WO 2-4867

New York 7, N. Y.

Automation Produces Refrigerators For Westinghouse

WESTINGHOUSE refrigerators are coming off the assembly line in the Columbus plant of the Electric Appliance Division at the rate of two-every-minute. When production lines now planned are in operation, this figure will be increased considerably.

The starting point for all refrigerators at Columbus is the steel storage and shear press shop area. At this point sheet steel for the outer shell, the inner liner, the door, the many small parts, and electrical sheet steel for the compressor motor are received, inspected, and released to the manufacturing operations.

From here on machines do everything: stamp out 500 compressor motor laminations a minute; coat structural sheet with a drawing compound; shear sheets to size; draw, form, trim, and notch structural sheet into hundreds of small intricate parts; blank sides, top and bottom of the door frame which are then joined together by welding; form the refrigerator door, then trim and pierce.

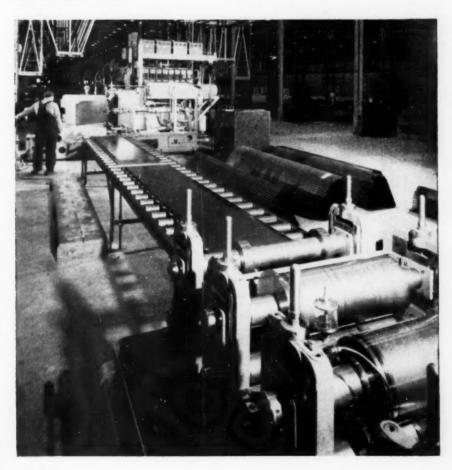
From the press shop, all fabricated

small parts are moved by pallet to the production line. To do this "grunt and groan" job of material handling the easy way, there are available throughout the plant 65 electric lift trucks and 18 electric walking trucks.

Sub-assemblies, such as the welded refrigerator door and door frame, are moved to the shell and door fabrication and metal finish section by overhead conveyor—there being some 27 miles of overhead and floor conveyors in the plant split into 51 separate systems.

In a separate press and fabrication area, large presses blank and form the tops, bottoms, and skirts for the inner liner or food compartment. These are later welded together in a six-wheel seam welder. The welded liners move through a metal finish line and are then taken by an overhead conveyor system to the degreasing and pickling machine, and then to the porcelain enamel department.

Scale, rust, oils, soap solutions used in presses, and all foreign matter are removed from the food compartment in the degreasing and pickling machine Cabinet Shell Fabrication. The outside of a refrigerator cabinet starts out as a flat sheet of steel. This sheet is first notched and pierced; it is then flanged on what will be the front and back edges—this is done on the machine in the right foreground; and finally it is shaped like a letter "U" on a tangent bender—the machine just beyond the roller conveyor. From this point on—until the cabinet is completely fabricated—welding plays an all important role. The back sheets, back brace, and reinforcing angles are first to be welded to the shell—this is done on the spot welder that is to the right of and beyond the tangent bender. The front panel, hinge bar, and food compartment gussets are next to be welded to the shell—this is done in a squaring and welding jig that is out of sight, but beyond the welder. Last to be added are the bottom pan and glides or leveling screws. The fabricated cabinet is then sent to the metal finish section.



May, 1954

after which a thin coat of nickel is applied to help the enamel adhere to surface. Following cleaning, a ground coat of porcelain is dip coated on; then reinforced with a spray gun, then dried at 180°F, and finally, fired at 1430°F. The second interior coat is white porcelain enamel which is sprayed on; then dried at 210°F and fired at 1380°F.

The food compartments are then conveyed to a sub-assembly area where all shelf supports are inserted and speed nuts and tap bars are put in place for attaching the evaporator. The inner liners then move by overhead conveyor to the refrigerator assembly line.

One of the more interesting fabrication operations is that of forming the outer shell for the refrigerator. The shell starts out as a single flat sheet of steel that is wide enough to provide the depth of box wanted and long enough to reach from the refrigerator bottom on one side to the top, across the top, and down the other side to the bottom. At Columbus, these sheets

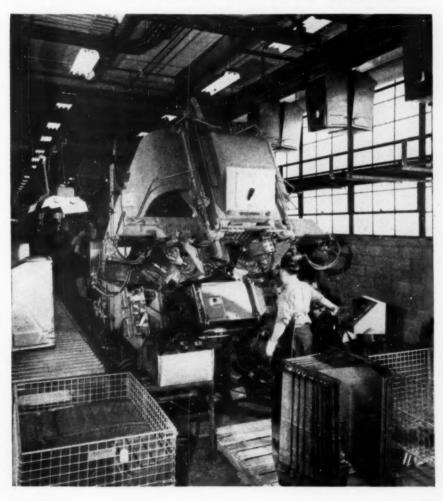
range from 25½ inches wide by 121¾ inches long to 25½ inches wide by 160½ inches long.

The first production step when making an outer shell is to notch and pierce the sheet. There follows in quick succession: flange rolling; then sheet bending to form the sides and top of the shell-the equivalent of an inverted letter "U"; then welding the back sheets, back brace, and reinforcing angles to the shell in a special automatic, multitip spot welder; then forming the bottom flange on the cabinet in a squaring and welding jig and welding the front panel, food compartment gussets, and the door hinge bar to the cabinet; then welding the leveling screws on the cabinet and the bottom pan to the rear panel; then drilling hinge mounting holes; and finally finish grinding and buffing. The completed cabinet is then delivered by belt conveyor to a point where it is transferred to an overhead conveyor that takes it to the bonderizing oven.

Shear and press area. Sheet steel is cut to size in foreground and drawn, formed, trimmed, or notched in the presses in the background. Panels for the door and the door frame are formed here. Also many miscellaneous small parts such as: supports, hinges, brackets, gussets and similar parts for strengthening the cabinet.



Seam Welder. Food compartments are made by seam welding a stamped, sheet metal top piece and bottom piece to a stamped and formed sheet metal skirt or wrapper that makes the sides and back. The top is inserted into the left side of the welder, the bottom into the right. These are positioned by guide pins and held in place by electromagnets. The skirt fits over the outside between the top and bottom. Welding is sequenced automatically. Finished food compartments are taken to the degreasing and pickling machine by the overhead conveyor seen above the operator's head.

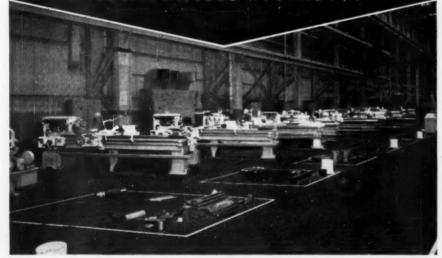


In the bonderizing oven the cabinet is first given a soap-wash followed by a double rinse; it is then rust-proofed and etched so the paint will adhere better; after being dried, the seams are sealed with Benolite—a plastic compound that makes the seams air tight; then transferred to another conveyor that takes the cabinet to the prime coat spray booth; through an oven where the prime coat is baked at 300°F for 50 minutes; then to the sanding room where every cabinet—and door too is inspected and any foreign particles

Assembly Line. This refrigerator assembly line in the Columbus plant is a striking example of current practice in mass production techniques. The white refrigerator cabinet shell that is to be transformed into a refrigerator during the assembly operation is moved down the line on a motor driven floor level conveyor. This transformation is made possible by the synchronized operation of overhead conveyors that bring subassemblies, components, and parts to the right spot on the line in a never ending procession and by the carefully dispatched electric trucks that keep the work station tote pans filled with screws, bolts, nuts, washers, clips, and hundreds of similar items used to assemble a refrigerator. It is in the final analysis, an excellent example of production scheduling and planning.



13 LEHMANN Engine Lathes
NOW at work in U. S. Steel's
New Fairless Works...



The largest integrated steel mill to be built at one time uses LEHMANN Lathes in its modern maintenance shops!

The Fairless Works, built on 3,900 acres and one of the biggest expansion projects built in our time, incorporates the most modern steel mill equipment available. One of the big jobs at Fairless is that of maintenance. Special shops to keep all the equipment used in this 2.2 million ton plant in top running order are an important part of Fairless.

The machine tools, cranes and other equipment necessary for cleaning, machining and repairing the mill operating equipment (which, in fact, make practically all repairs required at Fairless) include 13 Lehmann engine lathes! Some of these lathes are shown in the above photo.

Find out how Lehmann Lathes can bring efficiency, safety and speed to the operations in your plant. Write today for information or catalog or—send prints for time and money saving recommendation.

> LEHMANN MACHINE COMPANY

GRAND at CHOUTEAU - ST. LOUIS 3, MO.



HERCULES HOLDERS

and Shoulder Style Steel Type for number-



SPEED MODEL

Numbering Machines for consecutive or random numbering in a press.





ACROMARKER

Name-Plate stamping machines are made in several models and sizes for hand or foot operation.

AUTOMATIC NUMBERING HEADS

Numbering head shown consecutively numbers steel parts or nameplates. Used in a punch press, foot or arbor press. Hand styles also available.





ACROMARK

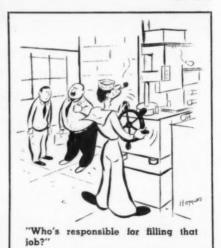
Series 9A Marking Machines are adaptable to marking just about any product or material. Use straight dies for mark-Roll ing rounds. dies for marking flats.

Write for more complete information on these and other ACROMARK numbering and marking machines.

THE ACROMARK CO. ELIZABETH 4, NEW JERSEY adhering to the paint are removed by sanding: then to the finish coat spray booth for the final coat of white enamel: then through the ovens where the final coat is baked dry at 260°F for 50 minutes: and then to the storage area at the head of the assembly line.

In this plant only superlatives apply: Nearly two million square feet of manufacturing area that houses 2613 production tools: more than two miles of roads and driveways outside the plant serve 41 truck loading and unloading docks: nearly four miles of railroad track with eight loading and unloading platforms that can provide for 49 cars simultaneously: 60 carloads of raw material received daily and 90 carloads of finished products shipped; 27 miles of overhead monorail conveyors and floor conveyors that are split into 51 separate conveyor systems; 65 electric lift trucks and 18 electric walking pallet trucks; and nearly 15,000 light fixtures. These facilities and services-when integrated -make the Columbus plant an extremely efficient production unit in spite of the fact that it is 2172 feet from one end to the other and 882 feet across.

The End





PORST BROS. MANUFACTURING CO.
Dept. MTB-5, STURGIS, MICH.



Down to the steel with chips

A glance at the spark flow tells you this CARBORUNDUM® Brand Abrasive Belt removes huge amounts of stock ... fast. But that's not all-it also produces uniform finish, eliminates extra operations. The versatility and economy demonstrated by this swing

mand on any metalworking opera-They cut fast, cool ... give smooth, frame belt grinder is yours to comtion, from deburring and polishing to weld grinding and snagging, with Abrasive Belts by CARBORUNDUM. even finish...long, useful life.

Whether you use 1/2" belts on deburring machines, 74" belts on stainless steel sheet polishers - or any size between-your CARBORUNDUM Distributor is a good man to know. He offers expert counsel, complete stocks, prompt service.

Through application "know-how" and product quality

CARBORUNDUM

continually puts more sense in your abrasive dollar



Pipe, tube and structural bending is now simplified with a PEDRICK PRODUCTION BENDER. Heretofore difficult bends, such as offsets and off-plane bends, can now be made in production quantities at an amazingly low cost. All PEDRICK PRODUCTION BENDERS are complete with motor, and are equipped with automatic duplicate

bending relays.

Write For Descriptive Folder, Dept. 3

> Prices start as low as \$1575.00



PEDRICK TOOL & MACHINE CO.

3640 N. LAWRENCE ST., PHILADELPHIA 40, PA., U.S.A.

Practical Hints on Drilling Light Gage Stainless Steel

By G. L. Stevens

Machining Engineer

Armco Steel Corporation

FABRICATION of stainless steel sheets or strip often involves a punching operation, either single or multiple depending on production requirements.

However, in many cases a small drill press or hand drill is used to supplement or replace a punch press operation. This is especially prevalent in assembly work and where punching equipment is not available or practical to use.

Still, there are pitfalls in drilling light gage stainless in a ½" drill press. It is virtually impossible to drill large holes, such as ¾" up to 1", with a conventional type of drill, even when the material is properly backed up and securely held. Invariably the drill will jam and either break in the work or stall the press. Even if by chance the hole is drilled it will not be round or true to size. Usually it is heavily burred.

Experiences like these have discouraged many shops from using drilling equipment on light gage stainless steel; yet the operation can be done easily and successfully with the proper drill grind and set-up.

Figure 1 shows what happens when

a conventional type drill and set-up is used on light gage stainless steel.

Figure 2 shows the type of drill recommended for this kind of work. The center section of the drill acts as a pilot while most of the cutting is done at the outer edges of the drill—similar to the action of a fly-cutter.

It has these advantages:

- The pilot presses the material flat on the support plate which provides a firm, true surface for the cutting edge of the drill.
- The drill cuts very little metal because most of the stock is trepanned and a circular disc drops out when the hole is completed (Fig. 4).
- 3. It can be used to drill holes from \(\frac{1}{6}'' \) to 1" on standard \(\frac{1}{2}'' \) capacity equipment. However, drills larger than \(\frac{1}{6}'' \) will run too fast and a speed reduction unit must be used. Drilling speed should not exceed 40 FPM.
- The work can be lightly held against a stud bolted in the drill press table and will not necessitate clamping down operations.

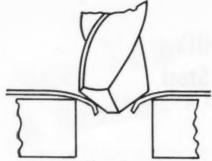


Figure 1.

- 5. This type of drill will not jam in the work or stall equipment,
- It requires very low torque and cuts efficiently.
- When the work is properly backed up, burrage is minimized.
- 8. Good tool life is assured.
- 9. Makes a satisfactory round hole.

However, this drill is only half the solution for drilling light gage stainless steel. Equally important is proper work support for the drill. This is especially true when drilling 18-8 (chromiumnickel) stainless, which has a tendency to workharden.

Figure 3 shows a drill set-up with poor support. In starting, the drill must be fed at uneven fast feed or pressure, and this is what happens:

- The work deflects ahead of the drill and permits the drill to ride without cutting. The stainless steel burnishes, which causes the drill to overheat and fail prematurely.
- Frequently the drill will break through light gage material at high feed rate and will not cut at this critical point. The result is a large burr.

Figure 4 illustrates the right way to support the work for the drill. A small steel or cast iron plate is fastened to the drill press table and a clearance hole drilled in the plate. With this method of support, drill feeds can be

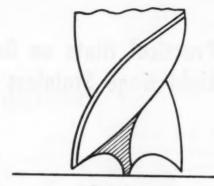


Figure 2.

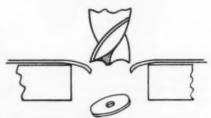


Figure 3.

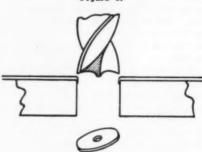
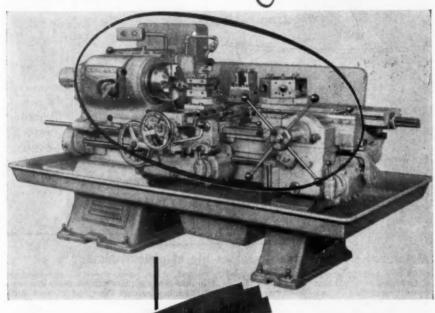


Figure 4

applied evenly and the drill will cut cleanly, even when breaking through the material. What little burr is left can readily be removed with a countersink, if desirable.

For quick set-ups on small run lots, a hardwood block can be used for support, figure 5. It will deflect slightly,

Operators do better on a JL turnet lathe



J&L TURRET LATHES GIVE

MORE Ease of Operation

MORE Power Transmission

MORE Rigidity

MORE Accurate Stops

MORE Efficient Lubrication

MORE Coolant on Cutting Tools

MORE Accurate Results

Jones & Lamson turret lathes are easier to operate. There are fewer controls, and they're all within easy reach. A power rapid traverse increases the machine's productivity and eliminates tedious, tiresome hand-cranking of the cross-slide. On bar feed models, a hydraulic unit with finger tip control opens collet, advances stock, closes collet and returns stock feed chuck.

J&L Lathes have many other important built-in features, too, which enable operators to turn out *better* work faster, with minimum fatigue.



J&L Lathes — designed with the operator in mind — enable you to perform your job better, with less effort.



Machine Tool Craftsmen Since 1835

JONES & LAMSON MACHINE CO., 520 Clinton St., Dept. 710, Springfield, Vt., U.S.A.

MACHINE TOOL DIV.

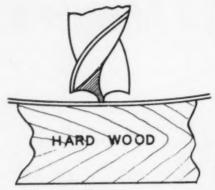


Figure 5.

but since the drill pilot makes contact with the stainless steel before the cutting edges do, the work is forced onto the wood support. This enables the cutting edges to establish initial contact on the supported surface.

The End

AMERICAN BUILT MACHINE TOOLS VOLUME 2

Is Now Ready

The Special Reports on Boring, Drilling, Grinding, and Gear Making Machines, as well as the report on the MAPI Formula, are now ready in Volume 2. Four hundred fifty pages of specifications, descriptions and articles to help you specify machine tools. Available from: MACHINE and TOOL BLUE BOOK, 222 E. Willow Ave., Wheaton, Ill. Price, \$4.50.

Metallized stainless steel increases life of piston rods 300%

Among a leading Diesel and gas engine manufacturer's varieties of heavy duty compressors is a type used widely in chemical plants and pipeline installations where gases are often highly corrosive, due to the presence of sulphur or other elements, making maintenance a definite problem.

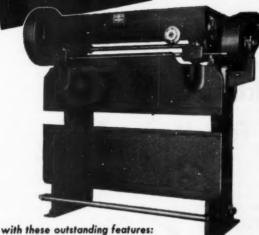
Since the rods must be operated without lubrication to prevent contamination of the gases, galling and subsequent damage to the packing frequently occurred. Also, since the rods are used in double-end cylinder compressors this permitted leakage of the product and contamination of the air.

The company originally tried metallizing on shafts returned by users for reconditioning and found that they not only lasted several times longer from the usual standpoint of diameter loss, but that galling no longer occurred. Damage to packing and leakage were eliminated, too.



PRESS BRAKES

SERIES 35 (35 Tons) in 5 standard sizes



- FRONT OPERATED VARIABLE SPEED DRIVE
- HAND OR MOTOR DRIVEN RAM ADJUSTMENT
 - ONE PIECE WELDED STEEL FRAME
- CLEAR WORKING SPACE IN FRONT AND REAR
- OVERSIZE LONG SLIDE SURFACES, CONNECTING RODS AND BEARINGS

Send for Catalog 54A, listing special features. We invite your inquiries about our dies which fit all standard press brakes. Dept. A.

CALL YOUR LOCAL DEALER OR WRITE

1-48"H 60" x 12 GA

48" x 10 GA.

- 49" -60"-

72" x 14 GA

96" x 16 GA.

120" x 18 GA.

PRESS CO. Inc. 550 W. Monroe St., Chicago 6, III.

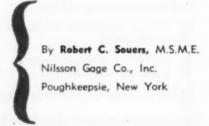
New **Dial** Indicator Design Features Only Four Moving Parts

CARDINAL requirement of dial indicators is that within ranges of the indicators they must indicate exactly any displacement applied to the plungers. In practical applications, they also must:

- Provide indication quickly, accurately.
- Have a minimum of internal friction or hysteresis loss.
- Employ rugged, easily maintained mechanism.
- 4. Be light and easy to handle.
- Be interchangeable with similar gages as per A.G.D. specifications.
- 6. Be easy to read.

When we at Nilsson began a study of dial indicators in 1946 we realized that gear-type indicators possessed two important advantages over other equipment performing the same function:

1. They are easily adapted to many applications; 2. they have a long gaging range relative to their amplification.



On the other hand, two disadvantages could be found: 1. Progressive accuracy is poor, in some cases requiring the gage to be checked at both maximum and minimum tolerance; 2. maintenance cost relative to initial cost is not favorable.

The program which was instituted at Nilsson was designed to produce a dial indicator which would reduce, or eliminate, the disadvantages of the gear train indicator without sacrificing any of the advantages.

The idea for the Nilcoid indicator was originated during 1951. In the Nilcoid movement the motion of the plunger is transferred from the conventional rack to a pinion which is part of the rocker arm assembly. Motion of the rocker arm is transferred to the helical track on the spindle. The mechanism then is composed of only four moving parts: Plunger, pinion, rocker arm and spindle. Only two bearing pairs are needed, one for the rocker arm assembly and the other for the spindle, figure 1.

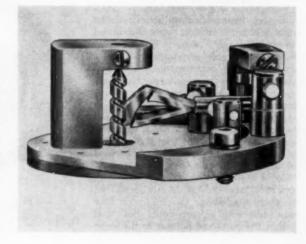
Magnification of the plunger motion is obtained in two parts: First by the ratio of the radius of the rocker arm to radius of the pinion—for a typical indicator (0.0001") this will be 10:1; secondly, by the ratio of the lead (0.10 inches per revolution for a 0.0001" indicator) on the rocker arm to the lead on the spindle helix, figure 2. If the rocker arm working surface were to be continued for a full circle, it would describe a helix. The helix action may be explained by stating that when the rocker arm is given a small angular displacement, the point at which the

rocker arm contacts the spindle moves through a given displacement parallel to the centerline of the spindle and rocker arm shafts. The centact point on the spindle helix moves through the same displacement. If the lead on each helix were equal, the angular displacement of both parts would be equal. However, for an 0.0001" indicator the lead on the rocker arm is 5 inches and lead on the spindle helix is 0.1 inches, so the spindle moves through an angular displacement 5/0.1 or 50 times the displacement of the rocker arm.

During the early evaluation of this operating principle, several interesting features were discovered.

- The movement inherently has low inertia because it has only four moving parts. This means rapid rate of response and good shock resistance.
- The movement has very low internal friction because it has only two bearing pairs and only four working surfaces. Hysteresis loss is so low it is difficult to even detect.
- The action of the two helical surfaces is a wiping action which

Fig. 1. In the new indicator the motion of the plunger is transferred from the conventional rack to a pinion which is part of the rocker arm assembly. Motion of the rocker arm is transferred to the helical track on the spindle.



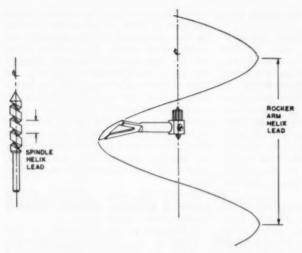


Fig. 2. The amplification of motion produced in transferring displacement from the rocker arm to the spindle is determined as the ratio of rocker arm helix lead to spindle helix lead.

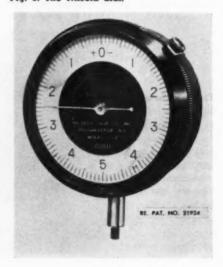
serves to keep these surfaces clean, reducing materially the errors caused by dirt, which occasionally becomes lodged between the working surfaces of dial indicators.

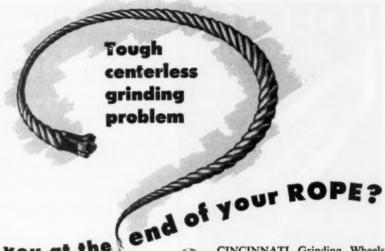
4. Errors due to wear, dirt or deformation of the rocker arm or spindle helix are magnified only by the helix ratio rather than by most of the gear train as they may be in a gear indicator.

Before beginning production of the new indicator, models were submitted to several large customers for the comments and recommendations of their engineering departments. Several changes in the final indicator were developed from suggestions made. It was found that in some factories where a large number of dial indicators were being used on concentricity fixtures, quite often the pieces gaged were out of alignment by twice the normal travel of an 0.0001" indicator; consequently, Nilcoid indicators can be provided with a 0.030" over travel. As a result of another suggestion, the indicator face was built with a "step-down dial" that brings the scale and pointer to the same plane. The needle position may be read from an angle without the usual error that occurs when the needle sets above the indicator face.

Meanwhile, exhaustive tests were conducted to see if the Nilcoid move-

Fig. 3. The Nilcoid dial.





901 you at the

Here's the

grinding wheel that will ABSOLUTELY solve it!

... because CINCINNATI Grinding Wheels are made to team-up with center-less grinders. And, with a Cincinnati Milling trained machinist on the spot to help, you can count on the right answer—FAST! Here's why:

We've solved hundreds of centerless grinding problems involving high stock removal, good finish, accurate sizing, and high production per dressing, by using the right CINCINNATI Wheels.

CINCINNATI Grinding Wheels were developed by Cincinnati Milling, which in the field of centerless grinders has done more research, had more experience and made more machines than any other organization in the world.

CINCINNATI Grinding Wheels are based on an entirely new approach to grinding wheels, the development of the grinding wheel as a true cutting tool, and they represent twenty-five years of Cincinnati Milling research and practical experience.

We are so confident—so absolutely sure—that CINCINNATI Grinding Wheels can help solve your tough centerless grinding problem that we make this unconditional offer: either you must be completely satisfied, or we will issue full credit for the CINCINNATI Grinding Wheel used.

So contact us at once. We'll send one of our expert machinists. He can show you how to get the most out of CINCINNATI Grinding Wheels. There is no charge for his service. Write, wire or phone Sales Manager, Cincinnati Milling Products Division, The Cincinnati Milling Machine Co., Cincinnati 9, Ohio.





ment would maintain its fine accuracy under continuous shock loading and vibration and to determine its wearcharacteristics over a long period of time. In the first test, an indicator was run many thousands of rapid cycles with periodic checks of the zero reading and the progressive accuracy. No measurable reduction of accuracy or change of the zero reading was detected during the term of the test. Another test was conducted by an independent testing organization to determine the wear-characteristics of the Nilcoid movement. The test, conducted for 10 million cycles on a Nilcoid indicator movement, produced no appreciable wear on the rocker arm and spindle.

This indicator is now beyond the experimental stage. Production schedules are being set up and this new instrument will be commercially available in a short while.

The End.



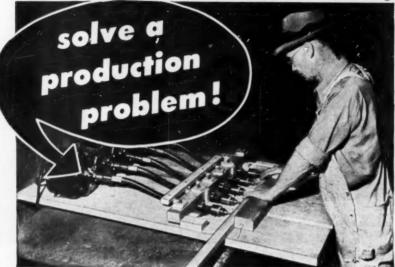
IN A ONE HAND OPERATION -

- · HOLDS firmly in any position
- GRIPS nuts or bolts of any material
 TIGHTENS nut or bolt securely
 - · RELEASES at the pull of the fingers

Write for catalogus MAKERS OF THE ORIGINAL SPINTITE WRENCHES OVER 150 STYLES AND SIZES

471 SHREWSBURY STREET. WORCESTER, MASSACHUSETTS WORLD FAMOUS HAND TOOLS FOR OVER SO YEARS

INGENUITY and STOW Flexible Shafting



THE H. T. Hunt Co., of Binghamton, New York, took a contract to make several thousand newspaper racks. One of the principal production problems involved in this job was the drilling of thousands of holes—which were at first drilled individually-using a templet. This method was inefficient, costly, and time consuming.

The Hunt Co. then decided to use five STOW tool shafts-driven by five 1/4 HP motorsin the arrangement shown above, to drill five holes at once.

Perhaps your ingenuity-and a STOW flexible shaft machine can solve one of your production problems, or do a drilling, brushing, grinding or sanding job better!



STOW streamliner flexible shaft machine.







MANUFACTURING CO

30 Shear St.



DESIGNERS OF EQUIPMENT in which power has to be transmitted between two parts at high speeds will find S.S.White flexible shafts a convenient, economical and practical solution to problems of this nature. The shafts are designed to operate with a minimum of vibration and friction, and their performance is unaffected by misalignment or movement of either the driving or the driven part.

A remarkable demonstration of these characteristics is shown above, in which an S.S.White flexible shaft drives the handpiece of a Precise portable grinder-miller. With the electric driving motor developing up to ½-bp at speeds ranging from 20,000

to 45,000 rpm this tool is capable of correcting hardened steel dies with a tungsten carbide milling cutter without first annealing the die. According to the manufacturer, the success of the application is "due to the very high speed of the Precise grindermiller and due to the excellent torque transmission possible through the flexible shaft — and what is equally remarkable is that the shaft runs cool and without vibration at such very high speeds."

The help and assistance of S.S.White engineers in working out your own flexible shaft applications is always available. Take advantage of it — there's no obligation.

SEND FOR THE 256-PAGE FLEXIBLE SHAFT HANDBOOK

It contains full facts and data on how to select and apply flexible shafts. Copy sent free if you request it on your business letterhead.



THE Sibhite INDUSTRIAL DIVISION

DENTAL MFG. CO.



Dept. H, 10 East 40th St. NEW YORK 16, N. Y.

Western District Office . Times Building, Long Beach, California

BLUE BOOK'S Know How Reference Sheets

Short metric tables

| | Length | | | |
|---------------------------------|------------------|-----------------|------------------------|----------------------|
| 10 millimeters = 1 centimeter 1 | 00 centimeters = | 1 meter Feet | 1000 meters = Yards | 1 kilomoter Miles |
| Millimeter | 0.03937 | 0.003 | 0.001 | ******* |
| Centimeter | 0.39371 | 0.032 | 0.011 | ******* |
| Decimeter | 3.93708 | 0.328 | 0.109 | ****** |
| Meter | 39.37079 | 3.280 | 1.093 | |
| Decameter | 393.70790 | 32.808 | 10.936 | 0.006 |
| Hestometer | 3937 07900 | 328 000 | 100 343 | 0.062 |

Volume

3280,899

1093,633

0.621

1000 cubic centimeters = 1 liter = 1.05668 quarts U. S.

1000 liters = 1 cubic meter

1 centimeter of water at 4° centigrade weighs 1 gram

1 liter of water at 4° centrigrade weighs 1 kilogram

| W | | |
|---|--|--|
| | | |
| | | |

1000 milligrams = 1 gram 1000 kilograms = 1 metric ton

1000 grams = 1 kilogram

| | Oz. | LD. | |
|-------------|---|---|----------------------------|
| Grains | Troy | Avoir. | Cwt. |
| 0.15432 | ****** | ****** | ******* |
| 1.54323 | 0.003 | ****** | ******* |
| 15.43235 | 0.032 | 0.002 | ****** |
| 154.32349 | 0.321 | 0.022 | ******* |
| 1543.23488 | 3.215 | 0.220 | 0.002 |
| 15432.34880 | 32.150 | 2.204 | 0.019 |
| | 0.15432 1.54323 15.43235 154.32349 1543.23488 | Grains Troy 0.15432 1.54323 0.003 15.43235 0.032 154.32349 0.321 1543.23488 3.215 | Grains Troy Avoir. 0.15432 |

Metric conversion table

Weights

1 grain = 0.0647989 grams

1 ounce, avoirdupois = 28.3496 grams

1 pound, avoirdupois = 453.593 grams 1 ton, 2000 pounds = 907.186 kilograms 1 ton, 2240 pounds = 1.016 metric tons

1 ounce, troy = 31.10348 grams

1 gram = 15.432 grains

1 kilogram = 2.2046 pounds, avoirdupois

1 tonne or metric ton = 2204.6 pounds, avoirdupois

Volume

1 cubic inch == 16.387 cubic centimeters

1 cubic foot = 0.02832 cubic meter = 28.317 liters

1 cubic yard = 0.7645 cubic meter

1 U. S. gallon = 3.78543 liters

1 bushel = 0.35242 hectoliter

1 perch = 0.700846 cubic meter

1 cubic centimeter = 0.0610234 cubic inch

1 cubic meter = 35.314 cubic feet = 1.308 cubic yards

1 liter = 0.26417 U. S. gallon = 61.023 cubic inches

1 hectoliter = 2.8375 bushels

1 inch = 2.54 centimeters

1 foot = 0.3048 meter

1 vard = 0.914402 meter

1 mile = 1.60935 kilometers

1 millimeter = 0.03937 inch

1 centimeter = 0.3937 inch

1 meter = 39.37 inches

1 kilometer = 3280.83 feet = 0.62137 mile





duction on every type of broaching operation—on keyways, on internal operations such as splines and finishing holes, and surface operations on flats, cams, or irregularly shaped parts. For the greatest broach economy,

For every broaching operation, you

are sure of better performance and longer life when you specify Amer-

ican broaches. American broaches give you efficient, dependable pro-

efficiency and dependability, insist on American broaches, made by a company with more than a quarter of a century's experience in the design and manufacture of broaches, broaching machines, and fixtures.

Shown above are a variety of American broaches. Included in the group are a round spline broach, a combination internal and inverted keyway broach. Also five sections of different surface broaches. In use, these sections are mounted in a broach holder in progressive stages to form a complete unit.



More than 35,000 gears have been broached to date on this American broach, and the broach still has a life expectancy of 35,000 more. The secret of obtaining high production from a well-made broach is proper sharpening at regular intervals. For best results, follow the manufacturer's instructions implicitly: improper sharpening can ruin a good broach. Send for American's free catalog on broaches. Just ask

American offers a complete line of push and pull heads to help you get maximum value from your broaches. All types are available, correctly designed for round, flar, keyway, spline, and odd-shaped broaches. A free catalog gives com-plete data on American push and pull heads. Write for your copy today. Ask for Circular

ercase Broach & Machine Co.

ANN ARBOR, MICHIGAN

See Amorican First - for the Best in Broaching Tools, Broaching Machines, Special Machinery



BLUE BOOK'S Know How **Reference Sheets**

Conversion factors

autilialia bar

0.003607

0.576384

0.01602

0.083

0.10

268.80

224.00

35.90

1.735

27.72

= English gallons

= cubic inches

= U. S. gallons

= U. S. gallons

= cubic feet

= cubic inches

= English gallons

= English gallons

= cubic feet

= punces

| Pounds to Kilogrammes | ******* | multip | ly I | by | .45 |
|--|---------|-----------|------|-------|---------------|
| Cwts. to Kilogrammes | ******* | | | ** | 50.8 |
| Tons to Kilogrammes | | 44 | | 44 | 1016. |
| Kilogrammes to Pounds | | | | 6.6 | 2.2 |
| Kilogrammes to Cwts. | ******* | | | 6.0 | .02 |
| Kilogrammes to Tons | | 44 | | 44 | .001 |
| Inches to Millimeters | | 44 | | 8.6 | 25.4 |
| Inches to Centimeters | | | | 6.6 | 2.54 |
| Feet to Meters | | *** | | | .304 |
| Yards to Meters | | 41 | | * 5 | .914 |
| Yards to Kilometers | | | | 44 | .000 |
| Miles to Kilometers | | 44 | | 8.6 | 1.6 |
| Millimeters to Inches | | | | 6.6 | .04 |
| Centimeters to Inches | | | | 88 | .4 |
| Meters to Feet | | 44 | | 66 | 3.3 |
| Meters to Yards | | | | 8.6 | 1.1 |
| Kilometers to Yards | | 44 | | 44 | 1093.6 |
| Kilometers to Miles | | | | 6.6 | .62 |
| U. S. Gallons | rs X | 8.33 | | poun | de |
| U. S. Gallons | x | | | cubic | |
| U. S. Gallons | x | | | | inches |
| U. S. Gallons | x | | - | | sh gallons |
| U. S. Gallons | â | | | iters | sn gallons |
| English gallons (Imp.) | x | | - | poun | 4. |
| English gallons (Imp.) | x | | | cubic | |
| English gallons (Imp.) | x | | - | ~~~~ | inches |
| English gallons (Imp.) | x | | | | gallons |
| | X | | | U. S. | gallons |
| English gallons (Imp.) Cu. ft. water (39.1°) | | | | | 4. |
| Cu. (1. water (39.1) | X | | | poun | |
| Cu. ft. water (39.1°) | X | | | | gallons |
| Cu. ft. water (39.1°) | X | | | | sh gallons |
| Cu. ft. water (39.1°) | X | | | tons | |
| Cubic foot of ice | X | | , | poun | |
| Cu. in. water (39.1°) | X | | | poun | ds gallons |
| CII IN WOTER CIVIT | | D DD 4220 | | | |

Ounces of water A column of water 1 inch square by 1 foot high weighs 0.434 pound. A column of water 1 inch square by 2.31 feet high weighs 1 pound.

Water is at its greatest density at 39.2° F.

Sea water is 2.6 to 3% heavier than fresh water.

Cu. in. water (39.1°)

Cu. in. water (39.1°) X

Pounds of water X

Pounds of water X

Pounds of water

Pounds of water

Tons of water

Tons of water

Tons of water

Ice is 8 to 12% lighter than water.

To Convert:

One cubic inch of water makes approximately 1 cubic foot of steam at atmospheric pressure. 27.222 cubic feet of steam at atmospheric pressure weighs 1 pound.

PRECISION PRODUCTION with ROCKFORD ECONOMY LATHES



MEDIUM-SIZED ECONOMY-PRICED

Big Accurate Lead Screw
Independent Feed Shaft
Precision Timken Bearing Spindle
Heavy Tail Stock, Anti-Friction Thrust Bearings
Hobbed and Shaved Headstock Gears
Tool Room Accuracy, Zero Precision Bearings
All-Geared Head, Quad-V-Belt Drive
Heavy Cuts, 16" or 18" Swing, 30" Center Distance
6' Bed, Double Wall Apron, 3100 lbs. Total Weignt

With these features Rockford Lathes offer you either Tool Room or High Production operation, with modern design, ample dimensions and high quality materials.

Ask a Rockford Machine Tool Representative to give you full details on the practical production advantages of these heavy service, medium sized, economy priced machines.

ROCKFORD ECONOMY LATHES-16" and 18"

ROCKFORD MACHINE TOOL CO. 3500 KISHWAUKEE STREET . ROCKFORD, ILLINOIS

12 inches = 1 foot

3 feet = 1 yard 51/2 yards == 1 rod

40 rods = 1 furlong

6 feet = 1 fathom

7.92 inches = 1 link

60 seconds = 1 minute

144 sq. inches = 1 square foot

9 sq. feet = 1 square yard

301/4 sq. yds. = 1 sq. rod 40 sq. rods = 1 rood

4 roods = 1 acre

3 inches = 1 palm 4 inches = 1 hand

6 inches = 1 span

12 articles = 1 dozen

12 gross = 1 great gross

12 dozen = 1 gross

14 pounds = 1 stone

60 minutes = 1 hour

24 hours = 1 day

7 days = 1 week

25 links = 1 rod

4 rods = 1 chain

120 fathoms = 1 cable length

71/2 cable lengths = 1 mile



BLUE BOOK'S Know How Reference Sheets

Weights and measures

Long measure

8 furlongs = 1 sta, mile 5,280 feet == 1 mile 3 miles = 1 league

Mariners' measure

5.280 feet = 1 statute mile 6,080 feet = 1 nautical mile

Surveyors' measure

10 square chains or 160 square rods = 1 acre 640 acres = 1 square mile 36 square miles (6 smiles sq. = 1 township

Time measure

28, 29, 30 or 31 days = 1 calendar month (30 days == 1 month in computing interest.) 365 days = 1 year, 366 days = 1 leap year

Square measure

640 acres = 1 square mile A township is 6 miles square = 36 sections A section is 1 mile square = 640 acres 1/4 section is 1/2 mile square == 160 acres 1/16 section is 1/4 mile square = 40 acres

Miscellaneous

18 inches == 1 cubit 21.8 inches = 1 Bible cubit 21/2 ft. = 1 military pace 2 articles = 1 pair 20 articles = 1 score 24 sheets = 1 quire 20 quires = 1 ream

Metric conversions

Linear measure

1 centimeter = 0.3937 in. 1 in. = 2.54 centimeters 1 decimeter = 3.937 in, = 0.328 feet 1 ft. = 3.048 decimeters 1 meter = 39.37 inches = 1.0936 yards 1 yd. = 0.9144 meter 1 dekameter = 1.9844 rods 1 rod = 0.5029 dekameter 1 kilometer = 0.62137 mile 1 mile = 1,6093 kilometers

Square measure

1 sq. inch = 6.452 sq. centimeters 1 sq. centimeter == 0.1550 sq. in. 1 sq. foot = 9.2903 sq. decimeters 1 sq. decimeter = 0.1076 sq. ft. 1 sq. yd. = 0.8361 sq. meter 1 sq. meter = 1.196 sq. yds. 1 sq. rod = 0.2529 are 1 are = 3.954 sq. rods 1 acre = 0.4047 hectare 1 hectare = 2.47 acres 1 sq. m. = 2.59 square kilometers 1 sq. kilometer =: 0.386 sq. m.

when you're thinking of REPLACING your old SPINDLE or ordering a new SURFACE GRINDER remember Whitnon SPINDLES

Heavily spring preloaded to keep spindle radially and axially rigid.—Stock Spindles are one full horse power, 3600 RPM enclosed motor, 220/440 volts, sealed in lubrication.

Sparks out fast leaving an excellent finish. — The only spindle rigid enough for crush dressing and perfect contour grinding.

Constant adjustment from spring preload keeps spindle rigid regardless of wear or temperature change.

Inquiries regarding standard or special Spindles for grinding, milling, boring and drilling operations receive immediate attention. Write today, specifying machine, voltage, frequency and phase.

THE WHITNON MANUFACTURING COMPANY
217 HIGH STREET NEW BRITAIN, CONN.

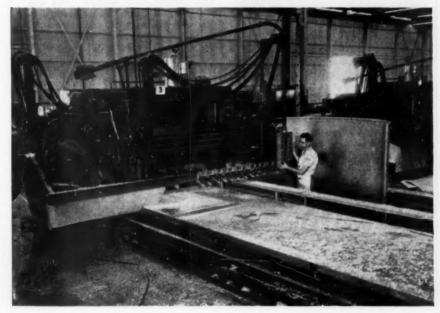
Specialized skin milling machines for aircraft industry

THE G. A. GRAY CO., Dept. B., 3611 Woodburn Ave., Cincinnati 7, Ohio, announces delivery to the aircraft industry of a series of highly specialized jet aircraft skin milling machines. An 84" x 42" x 24' unit recently delivered to the North American Aviation, Inc., Los Angeles, is pictured operating in the North American plant.

The largest unit thus far delivered is 22' wide x 67' long. The design features two 50 h.p., 3450 r.p.m. Onsrud heads. Both rail heads swivel 20 degrees either side of vertical. Left hand rail head is provided with additional movement in the extent of 15 degrees front to back either side of vertical. One and one-half inch instantaneous quill retraction is permitted by pneumatically actuated device. Micrometer adjustment provides unusually accurate repositioning of the quills. A 4" over-all vertical adjustment of the heads is permissible.

Because of the recurrence of certain specific angles, positive gear combinations are furnished to insure accurate automatic synchronization of head and table feed movements. A specialized pendant station is furnished. This unit, which is mounted on anti-friction bearings and carefully counter-balanced, segregates table and head movement controls. Separate feed motors are furnished which may be varied, reversed or stopped, from the pendant station. Complete steering control is thus available. Table feed ranges from 7.7 to 180" per minute are available. There are no metal to metal sliding bearing contacts since the new Gray non-metallic table, saddle, rail and gib bearings are featured throughout.

Aircraft wings and other structural sections are milled from solid aluminum plates up to 4" thick. Single tooth cutters are mounted on the spindle. The spindle is in reality the motor armature. There is no gearing within the head and only one speed, 3450 r.p.m., is available. The large aluminum plates are secured by vacuum chucks which are mounted on the machine table. Provision is made for securing full size templates to the machine.



HAVE A

milling problem?



HERE'S YOUR ANSWER

PORTLAND'S HEAVY DUTY MILLING HEAD

The PORTLAND milling head was especially designed and engineered to solve heavy duty milling problems . . . milling of armor plate, special alloys, etc. These heads are easily adapted to outmoded planers . . . converting them into powerful, modern, efficient planer-type milling machines.

SPECIFICATIONS

- Heads provided with 22 speeds in ranges up to 1000 RPM
- Infinitely variable Hydraulic feed from 0 to 60" per minute
- Designed for right and left hand, horizontal and vertical operation
- Horsepower ratings available from 10 to 100

Write for complete information today Ask for Bulletin BB





What Is The Situation? . . . How To Get Your Ideas Across

By **Edmund Mottershead**, President Mottershead Associates Chicago, III.

THE FOREMAN or supervisor who thinks before he speaks, who says the right thing at the right time more often than he speaks without thinking, is more likely to be effective in handling the people in his department and in dealing with other supervisors and foremen. If he will give careful thought to this problem of personal communication, either to one person or to several, he will find that knowing what he wants to say and knowing how to say it involves a further consideration: the situation in which he is speaking.

This can involve several factors. Does your listener need what you are trying to "give" him? Is he impelled to do what you say because of your position? Does he have a desire to be proud of his own work which will impell him to listen to advice and instructions and act accordingly? Is what you have to say something from which he can see a personal benefit.

If the situation involves more than a casual issuance of instructions, what has gone before? Have your previous contacts with this individual been pleasant, unpleasant, friendly, satisfactory, or what? What has been happening to him for the past few days and hours to set the frame of mind he is in when listening to you? What are the circumstances under which you talk to him—privately or before other workers, in a noisy shop or quiet office, at lunch or at the end of the shift when he is in a hurry to go home?

Hundreds of people have spent countless years of effort and time studying salesmanship, human relations, how to handle people, and in developing training programs to build result-getting conversational and sales ability. The result is that we know that each "sale" by a salesman is in reality a "purchase" by a customer, that each time you "teach" someone something,

in reality he "learns" it for himself after you have exposed him to the information or technique.

In most cases, there are five things which go through the minds of your listeners, five "decisions" which they make unconsciously before they accept and believe what you tell them and act as you would have them act. These include:

1. Their need for what you have to offer. It is not enough to cater to their whims and give them what they think

they want, for example . . . letting the men sneak off 5 minutes before quitting time because they like the idea and you think you can keep their goodwill by so doing. Eventually people blame others for their own mistakes, and will blame the foreman in their department for their own shortcomings when these cause them trouble.

When you are giving instructions, handling a grievance, taking part in a group discussion, you are "selling" your ideas. Are your ideas the ones which



will really be useful to the other fellows? If they do as you suggest, will they really be satisfied in the long run in terms of personal security, a sense of pride and achievement? If so, show them how and where as you tell them your ideas.

2. What is the particular idea which will best satisfy that need? Is your suggestion for wearing goggles the best answer to a man's need for eye protection on a grinding job? Maybe he should use a face shield instead.

3. Who is the best person to provide the ideas and guidance? The worker at the next bench who has been doing the wrong thing for twenty years, the safety engineer who has worked in the plant for six months, the shop superintendent who is married to the worker's sister-in-law, or the department head?

4. The cost to the individual in terms of time and effort, additional thought involved, changes in habits, etc. People are lazy. They don't like the effort of reading; hence the popularity of pic-

HARDNESS CONVERSION CHART

For Every Shop That Does Hardness Testing This latest

This latest and most nearly accurate Hardness Conversion Chart is a necessity wherever hardness testing is done. It has been compiled and produced by CLARK, makers of the internationally respected CLARK Hardness Tester for "Rockwell Testing." Printed on heavy stock convenient for wall mounting, the chart is offered free of charge to hardness tester users. Just attach this ad to your letterhead or write "Send wall chart." A copy will be mailed to you without charge or obligation.

P.S. If you would also like information on CLARK Standard and Superficial Hardness Testers, we'll be glad to send that along too.





CLARK INSTRUMENT INC.

10206 Ford Road Dearborn, Mich. U.S.A. ture magazines. They don't like the effort of going out to see poor movies; hence they say home and watch poor TV shows. They have been doing things on the job and in the shop a certain way for a long time, not necessarily the best way or even the right way, but a change means mental and physical effort they are loath to make.

5. The time to do it . . . NOW, you say (and hope). A large part of your "sales job" in getting your ideas across

to people is to convince them that the time to do it is right now, not next week.

After you have prepared to handle these unconscious decisions which are made in the minds of your listeners, you should ask yourself another question: "CAN they do what I suggest?" Are you asking a man to lift something too heavy for him? Certainly not. Are you asking a man to fill out a job ticket who can't read? Perhaps. Are you ask-

New Big Barrel Micrometers have 7 BIG Features

- Easy-to-reach Ratchet Cap. A Lufkin Exclusive! With the ratchet right in the cap you can still take "one-hand" measurements. Ratchet is completely enclosed protecting it from dirt and grit.
- 2. Big, Sensitive Direct-Feel Thimble.
- 3 Perfect Balance in Shorter Length.
- 4. Non-Glare Satin-Chrome Finish easier reading in either bright or poor light.
- 5. Easy-to-Read Markings Widely Spaced on Big Barrels. Circumference of the new barrel has been increased nearly 20% — wider spacings between graduations make it easier to estimate tenths of thousandths.
- Rapid Reading Big Numbers Mark Every Thousandth. Graduation lines are longer and clearer.
- 7. Slip-proof Black Crackle Finish on Frame. A Lufkin Exclusive. This durable and attractive finish makes the micrometer easiest to handle, especially when hands are oily.



Designed by <u>UFKIN</u> for Faster, Easier, More Accurate Measurements

This new micrometer is designed to make it the best balanced, easiest and most accurate to use. Lufkin micrometers are the easiest to adjust too — the reading line always keeps its original position directly in line of vision, and the thimble doesn't cover measurements on the hub. Hardened and ground one piece spindle. Micro-lapped anvil and spindle faces. Tapered frame for use in restricted space. Available with carbide-tipped anvil and spindle faces.

BUY UFKIN TAPES · RULES · PRECISION TOOLS
FROM YOUR DISTRIBUTOR

THE LUFKIN RULE COMPANY, SAGINAW, MICHIGAN 132-138 Lafayette Street, New York City * Barrie, Ontario

ing a man to handle a tool with which he is unfamiliar? Perhaps. Are you asking a group to accept a new line of thought which many of them cannot understand? Very possibly, Frame your requests for action from people in terms which make it easy for them to comply. just as the direct mail advertisers enclose a simple reply card in which all you have to do is check a box and drop it in the mail because no postage is necessary and your own name has already been inserted.

The most important single thing we can learn to apply to our daily round in the shop when dealing with people is to learn to see things from their viewpoints. This means seeing it from many different viewpoints depending upon the number and kinds of people in the department. The more information you can have about your listeners at any given point, the better you understand their basic viewpoints, the more you will know about the immediate situation in which you are speak-

110 Million Run!

WITH THE SAME DICKERMAN FEEDS!

Here are amazing, actual production facts on feeding stock for army rifle clips!

EQUIPMENT:

3 - 105 Ton Ferracute Presses 3 - Dickerman Die Feeds

80 to 85 pieces per minute PRESS TIME:

Over a year on 3 shifts -

PRODUCTION:

90,000 pieces per feed, per day 110,000,000 pieces produced to date — with feeds still operating in accurate, serviceable condition





Die ribbon from one of three 10 station progressive dies. Extreme proving ground accuracy is vital on every press stroke.

These are not claims, they're actual, cold — dollars and cents production facts. On your next punch press job, if production is a factor — if parts cost is a factor — if press speed is a factor — You can't afford not to use a Dickerman Feed!

SEND TODAY for literature and CATALOGS on the complete, dependa-ble line of DICK-ERMAN FEEDS.



H. E. DICKERMAN MFG. CO.

324 - 322 ALBANY STREET

SPRINGFIELD, MASS.

ing to them and be better able to predict their probable reactions to what you have to say.

As far as the immediate situation itself is concerned, there are four things to consider: First, the purpose of the visit or meeting. Are you sitting with the other people just for a friendly chat, or do you have something of a practical matter to discuss? Have you called this worker into your office to

talk about the weather, or did he have a grievance you felt should be investigated? Second, the prevailing rules of the meeting must be taken into account. There may be no-smoking rules or specific local customs which should be followed. It may be that such a simple thing as putting your feet up on the desk acts as a signal for the other fellow to relax and talk freely.

Third, consider what has happened



bulflex SPRING LOADED LIVE CENTERS

FOR GREATER ACCURACY
PRODUCTIVITY
LONG LIFE

Buiffex Live Centers eliminate the necessity of delicate adjustment...you save on loading time and need of operator skill. A \$\$\$ saver on repetitive work!

BULFLEX EXCLUSIVES:

- No breakage or premature bearing failure from uncontrolled end thrust
- Scientific distribution of loads minimizes wear
- Thrust bearings are spring loaded—radial bearings take no end thrust
- Guaranteed concentricity
- High speed steel point
- Neoprene oil seal in back
- Only spring loaded live center proven by years of performance

Bulflex Live Center advantages guarantee money saved, trouble-free performance. Write for details!

DISTRIBUTORSHIPS OPEN SOME AREAS

THE **bultool** COMPANY

Box 5094A Southfield Station - Detroit 35, Mich.

just before you get together and what is likely to happen right after you get through talking. What sort of a day or week has it been so far? Have things been going sour to the point that everyone is upset? If you are speaking with one person, it is entirely possible that he has just had a fight with his wife, his son was taken ill, or some other calamity had occurred which weighs him down and he has no patience with whatever you have

on your mind. After he leaves you, is he going home to the old battle royal, or is he going back into the shop to the sympathy of his friends? If it is a group meeting, what happens after you talk . . . is that the finish or will there be other comments and opposition from other people? All of these happenings have a definite effect on the success of your getting your ideas across.

Fourth, the physical conditions of the



place in which you are speaking, either to one person or a group, have an important influence on the success of your efforts. Talking to a worker against the noise of four punch presses is one thing; talking to him in the cafeteria or in your office is something else. Talking to one of the supervisors as the two of you are riding home from work may be entirely different from talking to him on the way to work in the morning when you are both in a hurry and

he is driving in rush traffic. Talking to a group in a quiet, well-lighted, acoustically controlled meeting room is entirely different from talking to them out in the shop where they have to stand around instead of being seated comfortably. Try to bear these physical conditions in mind and calculate their possible effect on the success with which you put over your ideas to your listeners.

Finally, as part of the situation, you



must consider the knowledge, attitudes, and beliefs of your listener or listeners. What do they know about your subject? How old are they; what do they already believe about the subject? What is their probable attitude towards you personally? What prejudices do they have which may be factors to consider? What is their probable attitude towards your purpose in speaking to them; have they already any firm opinion one way or the other which may support what

you have to say or which may offer additional resistance which must be overcome?

In any case, the foremen and supervisors in the modern industrial organization, who are faced with the daily problem of dealing with people and the constant problem of attending meetings and conferences of all kinds, must consider carefully the situation in which they will be expressing themselves so that they will prepare beforehand either



Adjustable Automatic Stock



Write for Autostop-Tap Guide Bulletin.

BRANCH

MFG. CO. North Branch, Minnesota



to compensate for adverse conditions or to take advantage of favorable conditions in persuading people to act or think as they might wish.

The End.



"I really hated to let Fenton go, but he just didn't have enough push."

Get precision and economy with Handles thicknesses up to 3/16" at speeds of 30 feet per minute and up. Rolls and dies for unlimited number of standard and speeds of 30 feet per minute and up. Rolls and dies for unlimited number of standard and speeds of 30 feet per minute and up. Rolls and dies for unlimited number of standard and speeds of 30 feet per minute and up. Rolls and dies for unlimited number of standard and speeds of 30 feet per minute and up. Rolls and dies for unlimited number of standard and speeds of 30 feet per minute and up. Rolls and dies for unlimited number of standard and speeds of 30 feet per minute and up. Rolls and dies for unlimited number of standard and speeds of 30 feet per minute and up. Rolls and dies for unlimited number of standard and speeds of 30 feet per minute and up. Rolls and dies for unlimited number of standard and speeds of 30 feet per minute and up. Rolls and dies for unlimited number of standard and speeds of 30 feet per minute and up. Rolls and dies for unlimited number of standard a

can you make this trim die in eleven hours in your plant?





ELECTRODE

we will show you how

man hours:

ELECTRODE MACHINING 8 hours
SETUP 2 hours



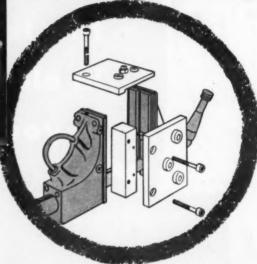
Corporation of michigan

732 N. Rochester Road • Clawson, Michigan

Cut Drill Jig Costs



Two side plates added to jaw of \$35 vise form a perfect jig for drilling in 2 planes. Extra-width-jaw-face models available for insertion of hardened dowels for extreme precision tolerances.



of drill jig parts. The improved AMF FLOAT-LOCK Instant-Change Drill Press Vise quickly adapts as the base for inexpensive two-plane jigs.

BOSSES on the quick-positioning, ratchet-locking jaw permit easy jig attachment. Float-Lock's positive anchoring does away with time-wasting clamps, straps, bolts and washers...prevents work from flying off the table! A flick of the handle causes the positive, screw-actuated jaw to grip firmly or release work from ½" up to 12" in size.

Call your AMF Float-Lock distributor for a demonstration or write for new 14-page Folder WF-53-1-A. Wahlstrom/Float-Lock Sales Dept., American Machine & Foundry Company, Rooms 1501-9, 511 Fifth Ave., New York 17, N. Y.



Shop HINTS



Low-Cost Face Plate Registers

By C. J. Emlyn

When machining short batches of components on engine lathes, it is a well-known practice to ensure concentricity of both ends of a piece, to make a register plate which is bolted to the lathe face plate. A typical instance is when a recess is machined in one end of a flanged part. The second end is turned by locating the recess on a circular steel plate fastened to the face plate, the plate being machined to form a true running register for the recess.

When a lot of this kind of work is done, the expenditure on steel plate from which registers are made can become heavy. A lot of metal can be tied up since machinists are reluctant to part with them in case they will come in useful for some other job. Another trouble is caused by the congestion and untidiness they make around the machine.

Simple and efficient registers can be made from a set of four ordinary hexagon-headed bolts, as shown in the illustration. The bolts are mounted in the face-plate slots with their heads outward; the bolt head centers are set roughly to intersect the perimeter of the recess on the component and are locked in place with a nut and washer on each at the back of the plate.

A step and face are turned on the bolt heads by machining them as if they were four points on the rim of a solid plate of steel. The face locates the component longitudinally and the step is calipered as shown to fit the recess diameter. Strap clamps fitted in the same face plate slots as the register bolts hold the component in place.

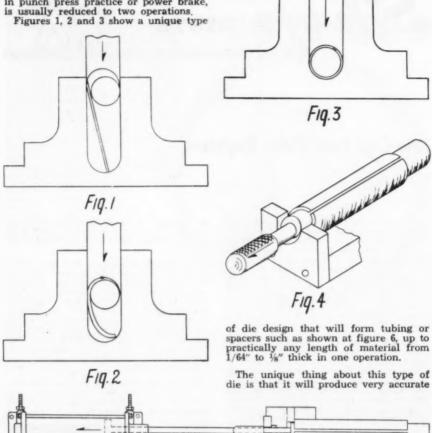
The same four bolts can be used several times for different jobs because they can be re-set to suit any diameter of work and trued with a light skimming cut. The heads will be machined away completely after a time so that the bolts become scrap, but the expenditure required to replace them is much smaller than the cost of a fresh piece of solid steel. The bolts can be stored in a tool box or drawer, thus keeping the floor clear around the lathe.

By turning the bolts so that the step is facing toward the lathe center line they can be used for locating the external diameters of workpieces.

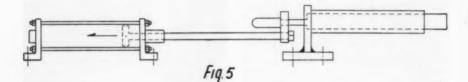


Unique tube spacer forming die

Die forming of a seamed tubing, either in punch press practice or power brake,









Spacer tui Fig. 6

inside diameters, as well as outside diameters, and will maintain free position of the formed seamed tube after the mandrel has been removed from the finished formed tube, as shown by figure 4.

Seamed tubes of practically any length can be so fabricated, and the mandrels can either be removed by hand, such as figure 4, or a double action air cylinder can be introduced and mounted close to the press, such as figure 5.

The required blanks can either be produced by the blanking process or sheared to the desired length and circumference requirements such as shown by figure 1.

In operation they are merely placed in the die alongside of the mandrel, such as figure 1. As the punch descends, the forming operation takes place, and the finished spacer tube is completed as shown by figure 3. By increasing the circumference requirements, practical metal to metal finish can be obtained on the finished seamed tube.

Shortening drills lengthens life

Temco Aircraft Corp., Dallas, Tex., got big results from a tiny change recently when it shortened its high speed twist drills \(\frac{4}{2} \).

Production from the drills increased



100 per cent in some cases; drill breakage decreased 50%, and resulting savings in manhours and materials are expected to exceed \$4,000 annually.

Before the 5/64" and No. 40 drills were shortened—on an employee's hunch—six dozen drills of each type were often expended in one day on eight machines. Maximum depth the 5/64" drill could penetrate was six sheets of .025" aluminum. Penetration of the No. 40 drill was slightly better.

Although drilling six sheets at a time caused excessive drill breakage, the expense incurred was less than the added setup expense required for drilling two

or three sheets at a time.

John H. Bownds, of Scurry, Tex., tried cutting ½" off the 2" to 23%" drills he had been breaking at a rate of several dollars a day. He figured the closer the chuck to the point of penetration, the less chance for breakage. He ground a new tip on his shortened drill and put it in operation.

Shortened, the 5/64" drill penetrated 15 sheets of .025 aluminum, 20 sheets of .020 and 10 to 12 sheets of .032 metal. Penetration for the No. 40 drill increased about 15%. Breakage rate dropped to two dozen a day for 5/64" drills and three

dozen for No. 40s.

Precision production arbor

By W. C. Betz

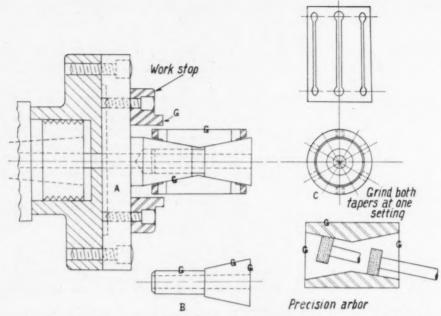
Where the diameter of the work must run true to the bore to within .0001" the expansion arbor shown will fill the bill,

expansion arbor shown will fill the bill. It consists of a base piece "A" and an integral taper plug with a straight bore in it to receive the outer taper plug "B" with a shank to fit into it and a screw or a rod to bring the two tapers together; a sleeve "C" with a double taper on the inside and the outer diameter running dead true with the taper bores.

All parts are accurately ground. The bore in the base sleeve and the o.d. taper are ground at one setting with the base bolted to the machine face plate; the pilot of the outer plug and its taper are also ground at one setting, as is the face of this plug. The grinding of the plug is done on an accurate running arbor.

The expansion sleeve "C" is drilled on the periphery near both ends with the slots sawed through to the drilled holes leaving the ends solid.

After hardening, the taper bores in the sleeves are ground at one setting, grinding as shown in the sketch, which assures



both tapers being exactly alike. The sleeve is mounted on the finished arbor and the outer diameter is ground to size.

On the hardened sleeve, draw both ends in hot lead to spring temper leaving the center about 57 to 60 R.C. hard.

A face stop ring is bolted to the flange of the taper piece "A" and the face ground true. Work placed against this stop locates any parts exactly from this face.

Note that the sleeve is relieved on both taper bores beyond the end of the saw slots; this stops pinching when the sleeve is expanded.

In service, the sleeve is expanded not more than .002", extreme. Work on these arbors will run true to .0001".

The arbors are trued on the face plate with the aid of an accurate dial indicator.

It is understood that the face of the face plate must run absolutely true before the arbor is fastened to it.

The arbor may be expanded thru the screw as shown or it can be operated thru a rod and an air cylinder or a lever arrangement from the back of the spindle.

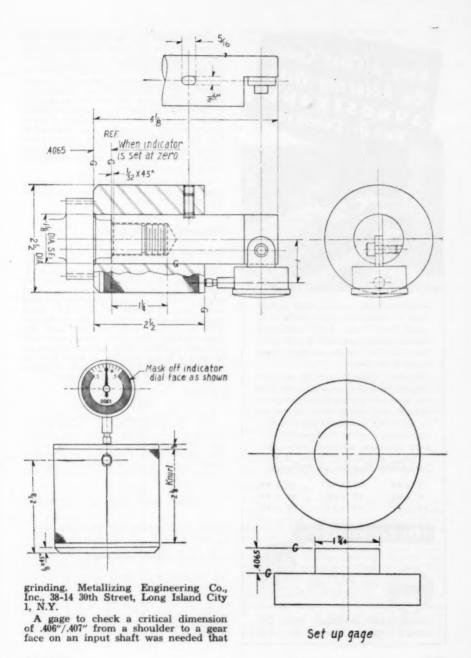
Accurate gage checks critical dimension

By Roger Isetts

As a result of their experience with the repair of piston rods by metallizing, all new piston rods to be used for corrosive gases are now made of carbon steel and metallized with stainless in the process of manufacture.

Several sizes of compressors are made in 2, 3, and 5 cylinder models from 12" bore x 14" stroke to 30" bore x 48" stroke. The rod shown in the picture is 4'8" long

3" in diameter for a 4'2" length, with a 4" flange at that point on the shaft, and the remaining length having a diameter of 2.494". Procedure is to undercut 42" of the 3" dia. portion of the shaft .030" undersize on the radius, thread this an additional .025" deep 14 per inch. Threads are then prepared with a special shaft preparing tool and the surface metallized with stainless, allowing .025" for finish





Simplify assembly, lower spoilage and get better production from this modern Sundstrand Bench Center. You'll check work between centers easier, faster and within limits of .0001" on this improved Sundstrand Bench Center.

"One-hand control" over all movable elements leaves the operator's other hand free to control rotation of the part being checked. Either headstock or tailstock can be unclamped, positioned and locked in place with a single hand operating the top lever. Investigate this bench center today.

Complete Range as Follows:

| 6" x | 18" | 12" > | 48" | 24" × | 48" |
|-------|-----|-------|-----|-------|-----|
| 6" x | 36" | 12" | 60" | 24" × | 60" |
| 12" × | 36" | 12" | 72" | 24" x | 72" |

FREE Additional Data



covering complete specifications and additional features is contained in this bulletin. Write for your copy. Ask for data sheet 444.

SUNDSTRAND MACHINE TOOL CO. 2535 Eleventh Street, Rockford, III., U.S.A.

could be used by unskilled labor. This presented the problem of making the gage simple enough to operate yet accurate enough to give a correct reading.

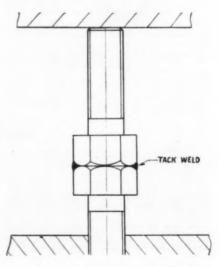
The gage illustrated worked surprisingly well. A hardened and ground tool steel shaft with a drilled hole in the end to fit over the part was made a sliding fit in a hardened tool steel ring. A .0001" graduated dial indicator was attached to the top of the sliding rod, the contact finger resting on top of the hardened ring. A dog point set screw prevented the rod from falling out.

A hardened and ground tool steel setup gage was made so the gage can be set accurately at zero.

Inexpensive jack screw

By Roger Isetts

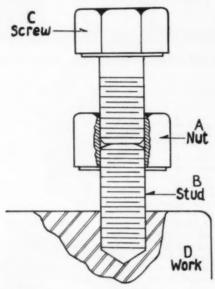
Illustrated is an inexpensive, easy to make, yet very efficient jack screw for use on jigs, fixtures and various other applications where an adjustable, positive work support is needed. Two hex head cap screws (lengths to suit the particular job) are placed head to head with the flats in line with each other and tack welded together. This allows plenty of wrench surface making it easy for the operator even if the screw must of necessity be placed in obstructed areas.



Assembling threaded stud to work

By Henry A. Roy. Sr.

A stud that is threaded from end to end can easily be assembled to its component part as follows: 1. Screw nut "A" half way down on the stud "B"; 2. Screw "C" is assembled to nut "A" until it contacts the top of stud "B"; 3. With a wrench on the head of screw "C" the stud



"B" is easily assembled to work "D."

After the stud is driven to its proper depth the nut "A" and screw "C" are removed by holding nut "A" firmly and turning the screw in the opposite direction from which it was originally turned.

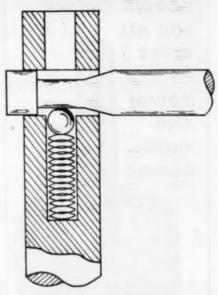
Suggestion for hand tool holder

By Federico Strasser

This illustrates an efficient and simple method for holding the driving handle of hand tool holders such as those employed for small taps, reamers and other light hand tools.

Make a longitudinal blind hole at the head of the holder, with a diameter slightly larger than the ball bearing used as indicated in the sketch. Another hole slightly larger than the driving handle intercepts the blind hole. At the far end and on opposite sides of the driving

handle, machine slots with the outer side sharp and perpendicular and the inner side well inclined. Into the longitudinal hole place a light helicoidal spring, with the ball on top. Hole should



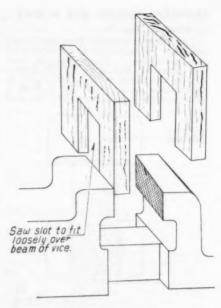
be large enough so that the spring moves freely. Force the handle through its hole. The handle won't slip out except under pressure since the sharp shoulders of the slot pressing against the ball prevent it.

Improved wood protective jaws for a machinist's vise

By H. J. Gerber

A wood protective for use on fine finished surfaces, particularly work made of the softer non-ferrous metals, is nothing new in machine shops. Most of the makeshift temporary jaws I have seen are simply two odd pieces of wood picked up around the shop and even though they may only be used a time or two they are quite a nuisance in that they are difficult to keep in position while the vise is being clamped on the work. A very easy way to solve this difficulty is to simply band saw an opening or slot in the under side of the wood jaw. This opening should be of a width to fit loosely





over the sliding beam of the vise and a depth great enough to bring the top of the false jaw flush with the top of the vise jaw. These can be made up in just a few minutes and we usually make a number of them at one time from hardwood scraps and keep them in our tool crib.

Don't forget to mention
MACHINE and TOOL BLUE
BOOK when writing
advertisers, or use the handy
Readers' Service card on
page 64.

Announcing a NEW SHEAR LINE by... Ida Inco

• 18 FOOT, AIR AND POWER-DRIVEN MODELS CUT 14-20 GAUGE



Foot Shears in 6 models

Capacity: 16 gauge mild steel in 36", 42" and 52" widths, and 18 gauge in 22", 30" and 72" widths. All-steel box-type construction.

Air Shears in 4 models

Capacity: 16 gauge mild steel in 36", 42", 52" and 72" widths. Feature low initial cost, ease of operation.



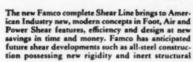
Power Shears in 8 models

Capacity:18 and 20 gauge mild steel in 36", 42", 52" and 72" widths, Feature "Electromatic Clutch" with faster aperating speeds.

Capacity:14 and 16 gauge mild steel in 36", 42", 52" and 72" widths. Feature "Electrometic Clutch" and rugged geor transmission, roller bearing equipped.



Model 1472 Fewer Shape



strength; four-edged alloy blades; and exclusive Famco "Electromatie" clutch . . . the electrically operated 9-point jaw clutch. In addition, Famco controls produce a new high in safety factor levels, never before possible with this type of equipment. For further details, see your dealer or write for free catalog.



Model 152 Power Shape

famco machine company

3118 SHERIDAN ROAD . KENOSHA, WISCONSIN

AIR PRESSES . ARBOR PRESSES . BAND SAWS . DRILL PRESSES . POQT PRESSES . POWER PRESSES . SQUARING SHEARS

MODERN TOOLS

ACTION

Portable Drilling, Tapping Machine Lowers Materials Handling Time

A. O. Smith Corp., Rochester, N.Y., purchased a Kaukauna Model 140-U machine to be used in their aircraft structure plant in Rochester. The original operation for which the machine was purchased involved drilling, tapping and reaming aircraft structure sections. However, while the program was being tooled up in Rochester the machine was used in conjunction with a Giddings & Lewis boring bar and a power rotary table. The jig or fixture was mounted on the table and while milling and boring operations were being done with the

Giddings & Lewis, the Kaukauna 140-U was positioned to the jig and many of the necessary holes were drilled, tapped or reamed. This enabled two operations to be done simultaneously on the same workpiece without the loss of time for costly positioning, material handling and machine shutdown.

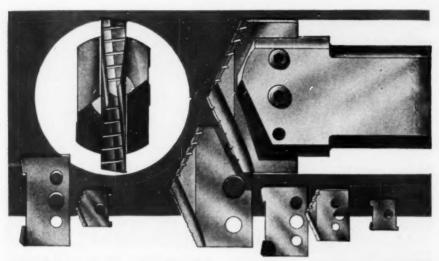
This 4" spindle universal machine, be-



This drilling and tapping machine, the Kaukauna 140-U, is used extensively for drilling, tapping and reaming fixtures, jigs and aircraft landing gear parts, at A. O. Smith Corp., Rochester, N.Y. The unit is also used in conjunction with an indexing table located on a boring bar; two operations are done simultaneously on the same part.

ing portable, was moved from station to station throughout the entire plant to do the many various drilling, tapping and reaming and boring operations necessary to tool up such a program.

Because of the universal features of the Kaukauna Model 125-U portable, one was purchased by Smith. This 2½" spindle machine is standard, having 4' of column



Drill Large Holes from the Solid with Interchangeable Spade Drills

Made in 256 cutter sizes, 1 to 5 inch diameter, in steps of 164, Conner type Spade Drills drill the required diameter in one operation, need no retracting to clear them of chips. Only eight sizes of holders are needed to handle all cutter sizes.

For general purpose work and in the Tool Room, use the cutter and holder assembly shown above. It is a rugged tool of great rigidity, recommended for large holes of medium depth.

For Production Drilling (for repetitive work), and for the somewhat deeper holes, use Conner type Oil Hole Holders designed for easy coolant flow and fast chip expulsion.



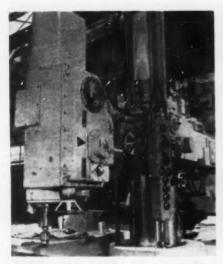
For Boring: Core Drill Cutters, for semi-finishing of cored and drilled holes, are made in the same 256 sizes, to fit the same spade drill holders.



In Canada: A. C. Wickman (Canada) Ltd., Queensway, Toronto 14

The GAIRING Tool Company

21228 HOOVER ROAD . DETROIT 32, MICHIGAN



Kaukauna Model 140-U universal drilling and tapping machine head located in the vertical position for drilling, tapping and reaming jigs and fixtures at A. O. Smith Corp., Rochester, N.Y.

travel and 4' of vertical headstock travel. It is being used exclusively in the tool room for maintenance and tooling operations involving angular drilling, tapping and boring as well as horizontal and vertical operations. Kaukauna Mach. Corp., Kaukauna, Wis.

Cutting quartz with flexible shaft machine

Cutting off large sections of tubing made of quartz and other silicate compounds is done with a diamond-tipped cutting wheel by the Amersil Co., Inc. of Hillside, N.J. Some of these tubes are as large as 1" thick, 1' in diameter, and 9' to 10' long. Since these large tubes are heavy, it would be difficult to bring them to a bench cutter. Also, each tube must be cut separately to meet specifications. They use a Stow flexible shaft machine with a 6" diamond-tipped cutting wheel and a water hose mounted on the flexible shaft to cool the cutting wheel. After the tube is cut off, they use the same machine to grind down the sharp

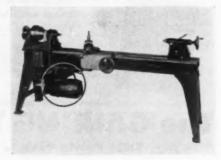


edges as shown. This is a F50 machine with a 1 hp motor, running at 3450 rpm. Stow Mfg. Co., 30 Shear St., Binghamton, N.Y.

Lima drive used on Oliver lathes

The Oliver Machinery Co., is now using Lima gearshift drives as original equipment on the Oliver patternmakers lathe. In this application, the drive is arranged for ceiling mounting, and provides sixteen rapid changes of speed. In the past, Oliver had been using a two-speed motor with necessary controls, obtaining a total of eight speeds.

Lima drives can be arranged for wall mounting, vertical mounting, and standard horizontal floor mounting, as well as the ceiling mounted application shown. The Lima Electric Motor Co., Dept. 119, Findlay Rd., Lima, Ohio.

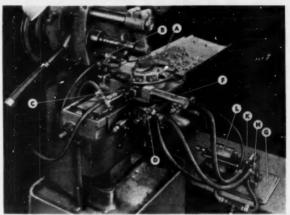


Mead air power converts hand miller into semi-automatic machine

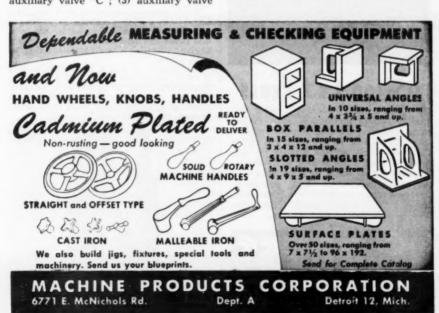
The problem was how to synchronize the motions so that the dial of the rotary work feeder would not rotate while the work was passing under the cutter — as shown, a Mead rotary work feeder is mounted on the moving table of a Nichols hand milling machine. The table is moved forward and back by a 1½" double-acting air cylinder with 5" strokes.

The sequence follows:
(1) 4-B master valve (not shown) opens main air line; (2) master valve supplies air through three branching hose lines to—

branching hose lines to—
FC-2 limit valve "F"
which is normally "on"—auxiliary valve
of rotary work feeder "C"—No. 2 valve
of timer "K"; (3) air passes through FC-2
valve "F" to work feeder "A" which indexes; (4) when rotary work feeder is
in locked position, air passes through
auxiliary valve "C"; (5) auxiliary valve



"C" admits air to H-1 midget workholding cylinder "B" and to the No. 1 valve "H" of the Timer "G"; (6) air passes through valve "H" into timer cylinder "L" and into feed cylinder "D"; (7) timer valve "H" closes, valve "K" opens





65-ton L&J Press

New No. 6 press featuring greater efficiency—lower production costs—heavy rigid frame—extra deep throat—replaceable bronze bushings in main and upper ram bearings—buttress threads on ram screw—hard bronze ball seat—roller bearings in flywheel or main gear and backshaft mountings—long, precision-scraped gibs—air clutch available. Also made in backgeared model. Other sizes 6 to 80 tons. Write for literature.



and supplies air to front end of feed cylinder "D" which retracts to starting position; (8) when cutter is clear of the work,
the cam which is mounted on moving
table of the mill closes valve "F," allowing
rotary work feeder to exhaust and pick up
another station; as the cam rides past,
it re-opens the air line to work feeder
and starts the cycle over again.

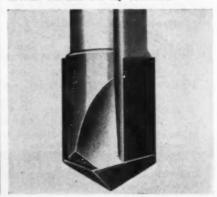
It should be noted that both the rotary work feeder and the work-holding cylinder "B" remain locked while the milt table moves forward and back; but when the table returns to its starting point "A" and "B" are momentarily released to index to the next station. The work-pieces are loaded by hand at the two nests near the front, and are ejected from the nests by a cam at the opposite side. They were threaded brass valve plugs which required a slot to be milled in the end. Production was increased from an average of about 375 per hour to more than 1200 per hour. Mead Specialties Co., 4114 North Knox Ave., Dept. NM-6, Chicago 41, Ill.

Drills out tap caught in costly part

A Whitman & Barnes carbide die drill was recently put to an unusual test by the Victor Equipment Co., Sarr Francisco, Calif.

While tapping a stainless steel regulator body, with a high speed precision ground tap, the tap became lodged in the part and could not be removed by any means at their disposal. The flutes were clogged with chips.

Fortunately, it was a through hole, and it was suggested that a Whitman & Barnes Die Drill, %" in diameter, be used. The tap was successfully drilled to a depth of ½". The flutes were then easily broken off and the tap removed.





Tests Prove That CIMCOOL With "95-16" Doubles Rust-Control

This is no "blue-sky claim"! Actual scientific laboratory and shop tests prove that Cimcool." with "95-16" doubles rust-control compared with a formula without this amazing ingredient.

But doubling rust-control is just one of many reasons why more and more plants are switching to CIMCOOL. This radically new and different coolant—this chemical emulsion—saves you money many important ways. Plant after plant reports that CIMCOOL covers 85% of all metal cutting jobs... and does a better job. It permits faster speeds because it combines friction reduction and cooling capacity in a degree never before attained by old-fashioned

coolants. It's longer lasting in machines. So Cimcool reduces downtime and cuts labor costs for cleaning and changing.

Let us prove to you what scientific tests and on-the-job experience have already proved. Put CIMCOOL to the test in your own plant—on your own machines. For a demonstration write, wire or telephone Sales Manager, Cincinnati Milling Products Division, The Cincinnati Milling Machine Co., Cincinnati 9, Ohio.

*Trade Mark Reg. U.S. Pat. Off.

CIMCOOL

for 85% of all metal cutting jobs

A PRODUCTION-PROVED PRODUCT OF THE CINCINNATI MILLING MACHINE CO.

Rollwelder cuts seam weld costs, time at Solar

A unique new welding machine, developed at Solar Aircraft Co., San Diego, Calif., is slashing manufacturing and equipment costs through an innovation in resistance welding technique.

The Solar rollwelder is used to automatically make circular seamwelds on J47 jet engine exhaust cone assemblies. Designed and built at a cost of \$14,000, the machine joins the afterburner fuel manifolds to the engine exhaust cone. One rollwelder replaces seven spotwelders—costing a total of \$49,000—which were formerly re-

quired to do the same work.

With the special rollwelder, cycle time for the welding operation has been cut almost 80 percent, from four hours to 45 minutes. One man operates the unit, where formerly seven operators were needed. Handling of the parts has also been significantly reduced.



In operation, the Solar rollwelder makes a 3" dia, seamweld around the support bosses of the fuel manifold. Usually in resistance welding the electrodes remain stationary while the part being welded is moved; in the Solar unit the seamwelder head, which is the moving member and constitutes the upper electrode, auto-





and Production Testina

● This Model 3-JR WILSON "ROCK-WELL" Hardness Tester is proving invaluable for tool room use and most production testing. It will pay for itself many times over by eliminating costly complaints from your customers.

These features make for accuracy and long life-

(1) Totally enclosed dirt and dust-proof "Zerominder" dial gauge. (2) Gripsel clamp screw for quick change and proper seating of penetrator. (3) All controls conveniently grouped. (4) Enclosed, easy-to-reach, variable speed dash pot. (5) Stainless steel elevating screw. (6) Standardized weights.

No matter what your hardness testing requirements, there is a WILSON "ROCKWELL" Tester to meet it. They are in two types—Regular and Superficial. They are in many styles with accessories for testing flats, rods, rounds and odd shapes. Ask about the WILSON TUKON for micro-indentation testing. Write us for complete information and recommendations.

*Trade Mark Registered



Wilson Mechanical Instrument Division

AMERICAN CHAIN & CABLE



230-T Park Avenue, New York 17, N. Y.

ANTIQUE SURFACE GRINDERS will keep you in the RED









Operating over-age surface grinders in your toolroom — the focal point of all quality production deals a punishing blow to plant costs and efficiency.

Recent surveys show that one out of every five machines now in operation is incapable of meeting today's precision tooling demands. If your plant is still using one of these antiques, it's time for you to talk with your Reid dealer. He will show you how modern Reid Grinders will increase accuracy and efficiency in your toolroom production.

PLAN NOW FOR REPLACEMENT

with REID GRINDE

For complete information on Reid Surface Grinders, write today for Catalog 618-6.



or write for copy

Model 618V illustrated

THE ENOX FAMILY CIRCLE

HACK SAW BLADES Hand and Power Sizes High Speed Steel

GROUND FLAT STOCK Precision Ground BAND SAW BLADES

100' Coil Stock-Welded Blades For all Machines

HOLE SAWS High Speed Steel Welded Edge

"THE TOOLS IN THE PLAID BOX" CAN SAW & MFG. COMPANY SPRINGFIELD, MASS.

BAND SAWS - GROUND FLAT STOCK - HOLE SAWS

LOOK AT THIS COMPARISON BETWEEN WESSONMETAL AND HIGH SPEED STEEL

Actual Job

Caterpillar Tractor Co.

Part Hame...Cutting Edge Buildozer Scraper Blade Operation Description...Form Edge Scraper Blade Machine Model—Type..Rackford Planer Sories #4

OLD IL S. STEEL METHOD

Averege Pieces

Total Tool Cost.......\$97.25 Total Tool Cost.................\$97.16

Arecane Places

Tool Cast per Plate HOW IS YOUR PRODUCTION SCORE CARD?

WESSONMETAL Cemented Carbide

WESSON METAL CORPORATION

LEXINGTON 34, KENTUCKY

matically rolls around a circular path while the work remains stationary.

Another unusual technical aspect of the welding machine is that the moving upper electrode carries approximately 14,000 amperes through a ½" dia. shaft and a floating joint.

The lower electrode of the unit is essentially an air-operated clamping fixture. After positioning the work and closing the lower electrode, the welding operation is completely automatic. Welding speed is adjustable from 8" to 48" per minute.

Although the new Solar unit—known as the planetary geared rollwelder—is a highly specialized machine, it is also extremely versatile. In less than 30 minutes the special tooling can be replaced by conventional tooling, making the machine a standard universal (circumferential or longitudinal) seamwelder.

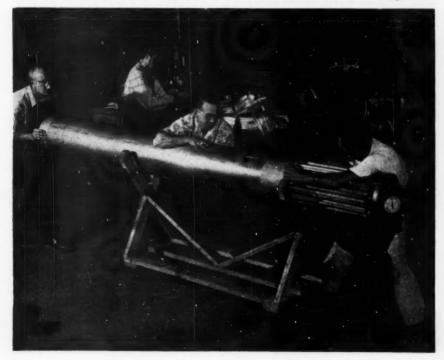
Sliding 12" dia. tube over 121/2" dia. accomplished with vacuum

How do you slide a 10' long metal tube 12" in diameter over one that is 12½" in diameter?

Solar Aircraft Company in San Diego, Calif., solved this unusual metalworking problem by use of a vacuum—a technique that, as far as the company knows, is unique.

The peculiar necessity of sliding the smaller tube outside of the larger one arose in the manufacture of augmentors for the Convair-Liner 240. The augmentors, designed by Convair, are large tubes installed on piston engine aircraft which utilize the exhaust gases to give the plane forward thrust, help cool the engine, and provide warm air for cabin heating and anti-icing.

Two major components of the augmentors built by Solar are a corrugated tube, about 124" long and 12½" across, and an outer shroud of the same length and



May, 1954

about 12" in diameter. Both items are made of Type 321 stainless steel—the corrugated tube of .050 thickness and the outer tube of .025 gauge. The corrugated tube is fabricated to a larger diameter because the corrugations must fit tightly to the outer shroud along their entire length, since they are later welded and a smooth weld is required to avoid cracking

A large wooden fixture was built to fit inside the corrugated tube and prevent it from collapsing, with slats to fit into each corrugation. Maple was used to prevent scratches or damage to the corrugations. Rubber covered metal ends which fit snugly over the wooden form and the corrugated stainless tube were built, and a vacuum pump was attached

to one end.

Between 10 and 18 psi of vacuum was used to shrink the corrugated tube from 121/2" across to about 11%". Next the outer shroud was slipped over the corrugated tube, and atmospheric air was allowed to re-enter the corrugated form. This would slightly expand the corrugated tube, and additional air pressure was applied to bring the corrugated tube up to an outer diameter of 11.770", which is the inner diameter of the shroud.

After the tubes are snugly joined, they are welded along the lines where each corrugation touches the outer shroud.

Pump rings ground on 2 sides simultaneously

Power steering for cars has become a practical reality and the disc grinder shown is playing an important part in the production of the highly accurate hydraulic pumping unit. The two parallel faces of the cast iron pump rings are simultaneously ground to close tolerances for flatness, parallelism and surface finish.

Manufactured by the Besly-Welles Corp., Beloit, Wis., the Besly Model No. 226-23" double spindle wet grinder operates semi-automatically. A single operator removes and loads pump rings at one arm of a work holder while grinding is in progress at the other. During grinding, the work is automatically oscillated to increase the degree of flatness. Hydraulic feeding of the spindles and abrasive discs against the work is controlled automatically with a timed "spark-out'



ROOFE LIVE CENTERS ASSURE MAXIMUM ACCURACY!

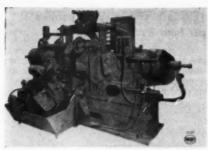
Users everywhere praise ROOFE Live Centers for increasing production, lowering costs and for giving maximum accuracy.

Made of the finest alloy steels, standard types are available in Morse Taper, Brown & Sharpe, Jarno, straight or special shanks to your specifications. Write for catalog.

Reliable distributors wanted.

HOUSTON GRINDING & M

2110 QUITMAN STREET . HOUSTON

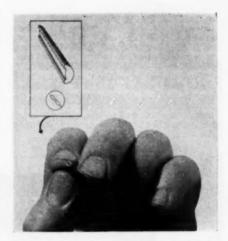


period to develop a high finish and accuracy. After grinding is completed, the fixture is automatically revolved with the new work indexed into position for the next grinding cycle.

The work holding blades may be interchanged to accommodate various work pieces and the speed of oscillation is variable to suit conditions.

Small wire drawing die, accurate to .0002", form ground with Diaform

The Pratt & Whitney Diaform wheel forming attachment was recently put to



a unique test when one owner used it in the grinding of a tiny split wire drawing die having tolerances of \pm .0002".

The small size of the die together with extremely close tolerances necessitated the making of a preliminary template on

F you bend thin-walled tubing

THEN

you can prevent wrinkling and make perfect bends to smallest radius, by the Cerrobend Method. Save time and money by filling tubes with Cerrobend, the expanding metal that melts in hot water. Then bend the tubes like solid rods. After bending, melt out the Cerrobend in hot water. It can be reused indefinitely.

Write for Data Sheet H3.

CERRO DE PASCO CORPORATION

DEPT. 7

40 WALL STREET

NEW YORK S. N. Y.

See our exhibit at Second Basic Materials Exposition, International Amphitheatre, Chicago, III., May 17 - 20, Booth 318. a hundred-to-one ratio instead of the usual ten-to-one. This 100 to 1 template made of 3/32" flat stock was then used with the Diaform and a 100-GV wheel to produce the ten-to-one regular template.

Two pieces of correct diameter wire were then placed in a "V" block and ground with a Diaformed wheel to the required form and thickness. The illustration shows the size of the split die being held together, with a greatly enlarged drawing.

175 dash panels spray painted per hour by 3 men

The spray-decorating of 175 dash panels per hour, with one man loading, another unloading, and a third painting, is being accomplished on 1954 models in each assembly plant throughout the U.S.A. and Canada of a prominent automotive manufacturer. This painting is done at a transfer station on the conveyor line, thus combining the transfer handling and the



NEW AUTOMATIC BAR FEED ATTACHMENT

Kalamazoo's new Bar Feed Attachment for Models 816, 824, 8C and 1220 Kalamazoo Metal Cutting Band Saws converts them to completely automatic cut-off machines. Combines low cost with high production and labor savings.

Kalamatic is a completely hydraulic selfcontained unit which opens saw frame to correct height, opens vise, feeds stock to correct length, clamps vise and lowers frame at controlled rate — all automatically. Eliminates operator fatigue, increases blade life.

Feeds rounds, flats, square, hex, pipe, tubing, etc., any length from 1/2" to 12", or longer if required.

Ask your dealer for a demonstration or write for descriptive material and name of your nearest dealer.

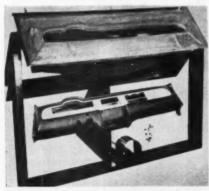
MACHINE TOOL DIV. Kalamagoo TANK and SILO CO.

532 HARRISON STREET . KALAMAZOO, MICHIGAN

painting operations.

Electro-formed metal masks, air-operated fixtures, and mask-washing machines, as produced by the Conforming Matrix Corp., are employed to accomplish a high production rate.

It is reported by the car manufacturer that 100 sprays are achieved before mask-cleaning is required. The fixtures operate at a pressure of 25 lbs. psi on the 28"



stroke of a 4" dia, air piston which produces a positive-pressure seal, between the work and the mask, thus assuring a cleanly painted line.

Inset in the photo of the fixture is an illustration of the painted part. Conforming Matrix Corp., 394 Factories Bldg., Toledo 2, Ohio.



Buy

PRESS ROOM EQUIPMENT

WIRE STRAIGHTENERS

Takes round or flat wire and tubing. Rolls adjustable by means of socket set screw. For use with automatic Slide, Roll or Hitch Feeds. Units available with 5, 7, 9 or 11 grooved ralls.



MOTOR DRIVEN STOCK STRAIGHTENERS

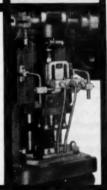
For all thin materials, Entering ralls power driven, top rolls are individually adjustable for stock thickness. Available in eight sizes.



SWEEP GUARDS

A positive safety guard on power presse. Easily installed. Downward motion of ram removes operator's hands. Rugged—withstands jarring impact of press. Needle bearings in guard housings assures long life.

Write Now for new catalog showing prices and complete line of Equipment.



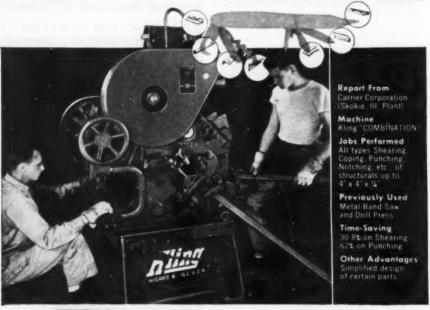
DURANT Tool Supply Co.

136 SOUTH WATER STREET, PROVIDENCE 3, R. I.

You, too, can

WHITTLE DOW

YOUR METAL PARTS' COSTS



OMBINATION SHEAR-PUNCH-COPER is the "jack-of-all-jobs" IN THE "BEST OF COMPANIES!"*

It's as all-round useful as your boyhood jackknife. For example at least eight different operations are performed by this Kling Combination Machine, in one of the plants of a nationally famous manufacturer of air-conditioning equipment, according to their report. In addition to timesavings of 30.8 to 62%, this "all-round" machine makes possible much simpler designing of important parts.

For maximum speed and safety, each end operates independently. Available in 3 sizes, for light, medium and heavy work. Ruggedly built for dependable performance over many years of multiple service.

* The following are some of the companies using Kling Machines: The Televising are sense of the companies using King Michaelmesh Mig. Co. Auto Specialities Mig. Co. Bethlehem Steel Co. Int. Carrier Corporation Grend from Works Inc. Commercial Tank and Welding Co. L. B. Foster Co. Kyle and Co. Link-Bell Co. Vincenses Steel Corp. Wobosh Railroad Co. Kyle and Co.

For detailed description of the Kling "Combination" and all the jobs it can handle, send for new Bulletin 347.

BROS. ENGINEERING WORKS . 1320 North Kostner Avenue, Chicago. Illinois













Technical BOOKS

Flying Saucers Have Landed

By Desmond Leslie & George Adamski; 13 amazing photographs, 232 pages; third printing; published by The British Book Centre, Inc., Dept. B, 420 W. 45th St., New York 36, N.Y. Price \$3.50.

Surely one of the most amazing and startling books ever published. According to several witnesses, flying saucers have landed in the United States! Despite air force secrecy, two encounters with visitors from outer space are here recorded and testified to. Over 50,000 copies were sold in less than two months after publication.

The author, George Adamski of Mt. Palomar, Calif., and six companions, said to be reputable citizens of the area,

encountered in the desert nearby a visitor from outer space. The complete account of this interview is made for the first time, as well as a number of startling photographs showing not one but several distinct types of flying saucers in greater detail than ever before.

Strange craft have been sighted throughout the ages; one section of the book by Desmond Leslie records hundreds of sightings dating from 1290 A.D. down to the present day. Ancient Indian and Sanskrit records give details of actual prehistoric flying machines that closely resemble the saucers of today. George Adamski began his research in flying saucers in 1946 when they were first sighted over San Diego. He has sighted hundreds of saucers and many of his photographs are on file with the air force.

Considerable speculation as to the nature of new metals used in the space ships is included.



Welding, Brazing, Soldering of Aluminum

This 186-page manual is ring bound; 6" x 9" pocket size; contains more than 125 charts and illustrations; sent without charge to any engineer, designer, technical man or company executive requesting it on company letterhead. To others, \$1.00 per copy, Desk PR, Reynolds Metals Co., 2500 South Third Street, Louisville 1, Ky.

Any engineer familiar with the welding of the older metals will find all he needs to know about welding, brazing, and soldering aluminum in this new process

Greatly enlarged edition of the manual by the same title originally published in 1946. The new edition contains material on 34 processes. These processes are shown in a large chart revealing their relation to one another and indicating those processes most widely used.

A second chart breaks down the wrought aluminum alloys and shows the various joining methods suitable for the various alloys. A third chart covers

SIGOURNEY

M-100

THE PRECISION BENCH DRILLING MACHINE

ACCURATE because table and column exactly squared one to the other.

LONG LIFE because of hardened and ground spindles.

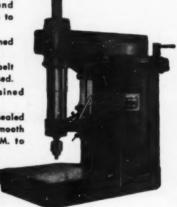
SAFE because motor, driving belt and spindles are entirely enclosed.

STRONG, RIGID for maintained accuracy.

SMOOTH AT HIGH SPEEDS — sealed ball bearings throughout for smooth eperation from 4000 R. P. M. to 10.000 R. P. M.

MODELS — with 1, 2, 3 and 4 spindles.

Send for illustrated bulletin.





18682

the aluminum casting alloys in a similar manner.

In the resistance welding section, im-portant advances in flash and percussion welding are presented. Another new development that has created much interest recently is "cold" welding . . . one of the two methods of "pressure" welding discussed. In cold pressure welding, the two work surfaces to be joined are brought together under pressure, sealing these surfaces.

Practical Design Guide

By Richard Rinehuls, P.O. Box 549, Binghamton, N.Y.; 100 pages, 200 illustrations. Price, \$2.00.

Here is a new source book of practical ideas, proven successful in industrial applications, to serve as a stimulus for ideas as well as a guide and reference to those who are developing machines, tools and manufacturing methods.

One of the subjects covered most com-

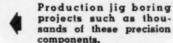






fixture.

Jig boring a master fixture section for jet aircraft. Bushings were fitted to multiple holes with tolerances accurate to .0005".



Or this seemingly impossible assignment: To bore over 148 different size holes at different angles, holding rigid relative tolerances into precision alloy castings, completed value of which, was over \$5000 each. Engineers are relying on B. Jahn every day to lick their real tough problems. Investigate the facilities at B. Jahn. 16 of the latest jig borers, every size, manned by master toolmakers and piloted by the best engineering brains available.

SEND FOR FACILITY LIST AND LITERATURE-REQUESTS FOR QUOTATIONS WILL BE HANDLED PROMPTLY



THE B. JAHN MANUFACTURING COMPANY, NEW BRITAIN, CONNECTICUT

prehensively is the field of pneumatics. A thorough discussion is given to the purpose and construction of valves and cylinders, practical circuits in application and steps in application.

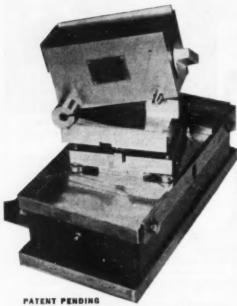
Another well-prepared chapter gives detailed information on electrical controls, including common circuits, automatic gaging, drives, motors, starters and solenoids.

Additional valuable information is given on the following subjects: Geneva

movements and practical applications; automatic feeds; springs; cam design, including the selection of motions, errors common to cam design, and developing and designing cams.

The author has drawn his material from 16 years of practical design engineering experience in eight leading industries. Designers, draftsmen, inventors, toolmakers, methods engineers and engineering students will find this handy volume exceedingly useful in their work.

MULTI-SINE



A TRIPLE COMPOUND SINE PLATE with a permanent MAG-NETIC CHUCK having angular adjustments in three planes.

Any angle or combination of angles may be obtained.

The most versatile angle plate on the market and practically indispensable for grinding, machining or checking angles within its capacity.

The MULTI-SINE is a precision tool, hardened and ground to close tolerances and then stabilized.

USE THIS TOOL JUST ONCE, AND YOU WILL WONDER HOW YOUR TOOLROOM OR INSPECTION DEPARTMENT EVER GOT ALONG WITHOUT IT

AMERICAN STANDARD CO., PLANTSVILLE, CONN.

The Science of Precision Measurement

Published by the DoAll Co., Des Plaines, Ill .: 246 page textbook is the basis for a thorough education in the fundamentals of precision inspection techniques for control of quality in product manufacturing. Price \$3.50.

The text discusses the constant and unchangeable wave length of light as the universal basis of present-day precision measurement, and its practical embodi-ment in the form of gage glocks. Ail ramifications of the application and care of gage blocks are given in a simple and logical manner. The direct use of gage blocks as measuring tools in fixed and indicating gage assemblies is shown with application photographs and charts.

Precise information on angle measure-ments, use of optical flats and interpretations of fringe lines, use of comparators, checking of micrometers, thread and gear measurements, etc., are also covered.

The book employs photographs, diagrams and charts to tell the story whenever possible, and this graphic approach contributes to the interest and under-standability of this book. Complete sets of tables so vital in reducing computation

NELCO CARBIDE TIPPED SLAB MILLS



Machine Army Automatic Rifle Re-ceivers in 1/5th the time . . . to better finishes . . . with 30 times more pieces per grind than conven-tional cutters!

An amazing story, but TRUE! Working on tough, scaly Perlitic Malleable iron castings, Nelco carbide tipped slab mills took a healthy 100-.125 bite—a full 3½ inches wide—on a 3 horsepower machine at the incredible feed of 11½ inches per minute! Not only did the Nelco slab mills surpass conventional cutters in speed, but produced better finishes, 400% more production per machine!

This example is typical of the time-saving, money-sav-ing benefits users report when using Nelco carbide tools. With nearly 800 tools regularly stocked, you can order—and GET—"special" tools at standard prices tools at standard prices. For full information on the complete Nelco line, send today for 48 page catalog.



time in gaging practice are shown in the last section of the book.

Tolerances

By Alexander Michael, St.; The Handy Length Book Company, 3507 17th St., S.W., Canton, Ohio, publishers; 144 page pocket size; industrial tolerance tables in both decimal and fractional equivalents. Price \$2.00.

The booklet is designed to minimize figuring that eats up important job time. The format is such that ease of reading further speeds the process of determining the proper plus or minus tolerance. An included localizer chart eliminates the

possibility of error in reading by blocking out all but the desired figures. This at-a-glance reference to tolerances should prove useful to the tool designer and executive as well as the machine operator who must hold the job tolerances.

The tables are especially adaptable to classroom and shop training programs where it is desirable to train workers or students in the use of decimal and fractional equivalents as they pertain to allowable tolerances.

The booklet itself is divided into two

you can save money on



(cutaway view)
MODEL 7500 the best available for long trouble-free machine tool service.

Designing special pumps for specific jobs has been a Brady service for many years. Brady small centrifugal pumps are currently being used as original equipment by leading manufacturers of air conditioning, refrigeration, dairy, machine tool and many other industries. If you have a pump problem or would like a recommendation on your pump requirements, write to our Engineering Department. There is no obligation, of course, and literature on our regular line is also available.

Brady CORPORATION Muncie, Indiana

parts. The first section is made up of fourteen tables devoted to standard industrial fractions and decimal equivalents to three places with tolerances for \pm .01 to \pm .25. Part two contains fourteen tables of machining tolerances to two decimal places and nearest fraction with the difference to three places and tolerances from \pm .01 to \pm .25.

Weldability of Metals

A 141 page book; explains factors determining weldability; gives causes and cures for hard to weld metals; details welding procedures for steels, nickel, iron, alloys, copper, aluminum and hardfacing. Reprinted from the 9th edition of the Procedure Handbook of Arc Welding Design and Practice. Publisher. The Lincoln Electric Company. Cleveland 17, Ohio. Price, 50 cents in U.S.A.; 75 cents elsewhere, postage paid.

Weldability of Metals gives the answers



to how to weld ferrous and non-ferrous metals. The various types of carbon and alloy steels are described by giving nominal chemical analysis, properties, uses and characteristics. The best welding procedure for each is completely detailed. American Welding Society specifications for electrodes used to weld are also given. The same treatment is given to copper, aluminum and nickel as well as their various alloys. Cast iron, forgings, cast steel, wrought iron, ingot iron, galvanized steel, terne plate and enameling stock are

similarly covered. A thorough analysis of the principles and practices of hardsurfacing is presented. Complete tabular data, drawings and pictures supplement the text.

Successful Labor Relations for Small Business

By James M. Black, public relations director for the Associated Industries of Cleveland and J. George Piccoli, director of industrial relations with the same organization. Based on actual industrial relations problems en-



FOR DRILLING, CORE DRILLING, ROUGH AND FINISHED BORING

The inner race of the GATCO bushing rotates with the tool, piloting the tool accurately below or above the work—or both.

Eliminates expensive tool construction—Reduces tool wear—Prevents seizure and pilot breakage—Especially adapted where precision is required.

Write for full information and prices

GATCO ROTARY BUSHING CO.

42330 ANN ARBOR ROAD, U.S. 12, PLYMOUTH, MICH. Telephone PLYMOUTH 1472 countered in hundreds of smaller companies of 1,000 or fewer employees. Published by McGraw-Hill, 327 W. 41st St., New York 36, N.Y. Price, \$6.00.

This book offers sane recommendations and specific techniques for practical guidance on such questions as: What to do in the event of a representation election or a strike; how to negotiate the first contract with a union; how to improve an existing contract; how to take a case to the NLRB; and how to select a qualified arbitrator.

In the authors' own words: "If a com-

pany understands initially the value of sound industrial relations, based on consistency of action in carrying out policy, it will avoid serious labor trouble. That is the approach taken in this book."

Designed to aid practical management in smaller firms that do not operate on a national scale and that may actually be harmed (or at least not helped much) by national patterns developed for much larger organizations.

Part 1 answers some 80 questions on personnel policy. It analyzes policy in a number of small and medium-sized



companies, reviewing each aspect falling within the scope of collective bargaining and in the so-called economic fringes. Recommendations are offered, which show how to set down a consistent personnel policy in writing and how to apply it uniformly.

Management Faces the Organizational Drive, Part 2, explains company rights in the representation election and supplies the basic rules of company strategy, and points out the functions of the NLRB in the election situation.

Part 3, Management at the Bargaining

Table, shows the step-by-step developments in negotiating the first contract with a union. Every section of the labormanagement contract is analyzed, using an actual case history and commenting on each clause and on implications of the wording. The 16 chapters comprising Part 3 also examine the management's and the union's position, together with the reasons for taking the position. They emphasize strongly the need for accurate research and the importance of long range planning in collective bargaining. Three additional chapters discuss How to Im-



prove An Existing Contract.

Part 4, The Strike, outlines a practical management strategy for acting wisely if and when the threat of strike or the strike itself occurs. It also includes a chapter titled "The Back-to-Work-Movement." Part 5 explains the functions and operation of the NLRB in handling the labor relations problems of small and medium-sized firms. According to the authors, many small manufacturers have lost cases that by rights they should have won—and all because they didn't know

what the NLRB is supposed to do. Part 6 not only gives sound advice on how to choose a qualified arbitrator, but also points out the types of disputes on which he should pass judgment.

"You Can Do Business With Labor," the final chapter, summarizes the authors' philosophy on labor-management-govern-

ment relations.

Black is public relations director for the Associated Industries of Cleveland, and Piccoli is director of industrial relations with the same organization.



POUGHKEEPSIE . NEW YORK



New Uses of Materials for Product Development to be Discussed at Chicago Materials Show and Conference

Hundreds of new uses of materials for products manufactured by the nation's industrial plants will be considered and discussed at the second Basic Materials Conference, to be held at the International Amphitheatre, Chicago, concurrently with the Basic Materials Exposition, May 17-20.

Displays and conferences will cover not only materials which improve the utility or sales value of capital and consumer goods but also those materials which reduce production costs. Discussions will range from late developments in solving such problems as corrosion and methods of joining materials to forecasts of materials likely to be used by industry in the next ten years.

One of the highlights of the program will be a study of materials currently being developed for manufacturing rockets and guided missles to determine how such materials can be used for the whole range of peacetime products.

With the principal emphasis on development of new products, the show and conference are expected to attract more than 10,000 products designers, project engineers, production experts, research men, sales and marketing executives, as well as top management.

Seventeen outstanding specialists will address the sessions. T. C. Du Mond, editor, "Materials & Methods," will serve as general chairman and open the meeting with a review of new developments in engineering materials. Carsen E. Hawk, who heads the development department of the liquid engine division, Aerojet-General Corp., will deliver a paper on peacetime uses of materials developed for rockets and guided missles, entitled, "Rockets and Guided Missles—How New Materials for Weapons Can Help Industry."

Other major topics include new metal forming processes and uses of non-metallic materials. One session will be devoted exclusively to advising companies how to establish a materials department, with particular emphasis on gathering information about new materials and how to use the data within a company.

Exhibits will range from new uses of such conventional materials as wood and glass to displays showing new uses of ceramics, recently developed plastics, new metals such as titanium and zirconium, as well as new materials for plating and surfacing, and bonding and joining.

Unlike vertical shows which place their stress on particular uses of a single material, the Basic Materials Exposition and Conference will consider the relation of the various materials to each other.

Advance registration cards may be obtained from Clapp & Poliak, Inc., 341 Madison Ave., New York 17, N.Y.



Adamas Carbide Corp. has moved from Harrison, N.J., to a new million-dollar plant at Kenilworth, N.J. It is thought the new plant will increase production 50%. It incorporates all the latest developments of modern straight line production and quality control.





New West Coast branch factory for Hanchett Mfg. Co.

Announcement has been made of the opening of the West Coast plant and ware-

house of the Hanchett Mfg. Co., Big Rapids, Mich. The modern building, which will house the factory, warehouse for replacement parts and the sales and service offices, is located at 5727 S.W. Macadam Ave., Portland 1, Ore., on a prominent highway, easily accessible from the downtown section of Portland.

Name change

Miller Motor Co., Melrose Park, Ill., manufacturer of air and hydraulic cylinders, boosters and accumulators, announces that its name has been changed to "Miller Fluid Power Co."



Engineering society charters 112th chapter

The American Society of Tool Engineers chartered its 112th chapter recently in Whiting, Ind. Roger F. Waindle, national president of the 28,000-member society, presented the charter to Chapter Chairman Leslie L. Thill, chief inspector, Continental Foundry & Machine Co., East Chicago.

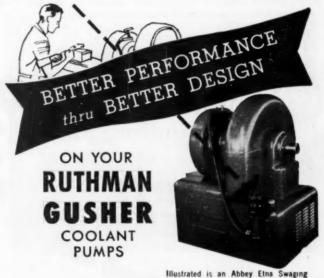
The newest addition to ASTE is called the Calumet Area chapter and comprises East Chicago, Gary, Hammond, Whiting and surrounding areas.

Assisting Waindle in the chartering

ceremonies were Harry E. Conrad, executive secretary of the society, and Howard C. McMillen, a society vice-president.

Guest speaker on the program was Frank C. Hockema, vice-president and executive dean of Purdue University, whose topic was "Tool Engineering and Education."

Other officers elected for the coming year are: first vice-chairman—Cecil E. Chapman, superintendent, Roll Accessories, Inland Steel Co., East Chicago; second vice-chairman—David MacGregor, works manager and chief engineer, Ed-



Illustrated is an Abbey Etna Swaging Machine, Series #154, equipped with a Ruthman Gusher Coolant Pump

All Gusher Coolant Pumps are designed to give you better performance. You get split-second control of coolant flow from the instant the machine is turned on.

Pre-lubricated heavy-duty ball bearings require no further lubrication. There is no packing or priming necessary. The electronically balanced rotating assembly reduces vibration and lengthens the life of your Gusher Coolant Pump. Always specify Gusher Coolant Pumps. Write for catalog.

THE RUTHMAN MACHINERY CO.

ward Valves, Inc., East Chicago; secretary—Robert J. Helton, tool engineer, American Steel Foundries, Hammond; and treasurer—Wayne T. Bates, methods engineer, Combustion Engineering, Superheater, Inc., East Chicago.

Metal Removal Co. sets up branch in Detroit

A new sales office and warehouse was recently established in Detroit by the Metal Removal Co., Chicago. Charles E. Davis, president, announced the step was taken to facilitate operations in the heavily industrialized Detroit area.

Nelco buys Modern Tool

The Nelco Tool Co. has announced the outright purchase of the Modern Tool Co. of Berlin, Conn.

This acquisition has effected an increase of 30% in personnel and the addition of over 5500 square feet of manufacturing area, complete with modern machinery. The new plant will continue to manufacture and market the present line of Modern tools under that name; however, the new building will be known as the Modern Tools Div. of the Nelco Tool Co. Plans are now being formulated to further expand the Modern Tools Div. to



Handle small parts of nearly any shape or material in oriented position—single file—without damage. Instantly controllable feeding rate insures steady flow of parts at required production speeds. Electromagnetic—no mechanical wearing parts—ideal for use in automation setups.

Write for FREE Catalogue Data SYNTRON COMPANY
300 Lexington Ave. Homer City, Pa.

produce custom engineered carbide cutting tools now being manufactured in the main Nelco plant in Manchester.

All personnel of the Modern Tools plant will be retained by Nelco and further additions to the production staff are now

being made.

Thomas Hollis, vice-president and general manager of Nelco, has appointed William A. Coe as general manager to direct operations at the New Berlin plant. Hans Nelson, former president of the Modern Tools Co., will continue to be associated with the company in an advisory capacity.

Beckett-Harcum opens southern branch

The Beckett-Harcum Co., of Wilmington, Ohio, has announced the opening of a branch office in Birmingham, Alabama, prompted, it is claimed, by the rapid growth of industry in the South. The firm's southern manager is H. H. Hackett.

Kennametal plans Detroit area plant

Kennametal Inc. of Latrobe, Pa., has announced that a contract has been let for the construction of a new manufacturing plant and office building at 10201 Capital Ave., Oak Park, Mich.







Lobdell to manufacture Bridgeport and Diamond machines

Lobdell United Co., Wilmington, Del., has announced that it has acquired the engineering, patterns, and tooling and all rights to the manufacture and sale of the Bridgeport and Diamond lines of grinder, and abrasive cut-off machines. They were formerly manufactured by the Bridgeport Safety Emery Wheel Co. and the Diamond Machine Co. of Bridgeport, Conn., and by the Columbia Div. of Lodge & Shipley Co. from whom Lobdell United Co. purchased them. Lobdell United Co. is a wholly owned subsidiary of the United Eng. & Foundry Co., Pittsburgh, Pa.

New offices for Morey Machinery Co.

Morey Machinery Co., Inc., has announced the removal of its executive offices to 383 Lafayette St., New York 3, N.Y. The new offices occupy 10,000 square feet of floor space.

Before the end of the year, Morey expects to occupy the ground floor of the building with a showroom for the display of machine tools under power.

Waldes Kohinoor revises price structure

A major revision in the price structure of its Waldes Truarc retaining rings including both price reductions and increases—has been completed by Waldes Kohinoor, Inc., Long Island City, N.Y. Prices have been lowered on more than

Prices have been lowered on more than 75% of the line with some reductions running as high as 50%. The cuts have been made possible, said Harry Waldes, executive vice-president, by improved manufacturing techniques.

Stainless steel rings show a general upward trend in price at all quantity levels, the increases made necessary by higher costs of materials, labor and die replacements.

Oster buys Cummins Power Tools

John Oster, Jr., president of the John Oster Manufacturing Co., Racine and Milwaukee, Wis., and Paul Jones, president of the Cummins-Chicago Corp., have announced the purchase of the Cummins portable tool division by the Oster Co. No changes in the Cummins sales organization are contemplated.

Jones & Lamson opens new district office. The Jones & Lamson Machine Co., Springfield, Vt., has announced the opening of the sixth of its district offices, located at Plaza Station, Charlotte, 5, N.C. E. H. Wells, who has been representing Jones & Lamson in the South for the past four years, has been appointed as manager of the Charlotte office.

Office machinery and equipment manufacturers to show in St. Louis

Nearly a million dollars worth of the latest office machinery, equipment, furniture, systems and supplies, including new developments never before publicly displayed, will be featured at the 1954 NOMA Office Machinery and Equipment Exposition in Kiel Auditorium, St. Louis, May 24 through 27.

The four-day event is sponsored by the National Office Management Association in conjunction with its 35th International Conference. Cooperating with NOMA in

conducting the exposition are the Office Equipment Manufacturers Institute, the Wood Office Furniture Institute and the Metal Business Equipment Industry. The Office Management Association of Great Britain and the Nippon Office Management Association will be represented in the International Conference.

Diamond tools company founded

Clayton S. Parsons, formerly New England and New York State manager for J. K. Smit & Sons, Inc., has formed his own company for the manufacture and sale of industrial diamond tools, diamond

Drill Hardened Steelswithout Annealing –



With the new, improved "HARDSTEEL" Drill, you can do accurate, smooth drilling, countersinking, countersboring and reaming in steels hardened by any process without first annealing the work. And they work with equal ease on work-hardening steels and high carbon—high chrome steels of any degree of hardness.

"HARDSTEEL" Drills fit standard drill presses. They save time and reduce rejects. They permit engineering changes requiring additional drilling after hardening. And parts drilled after hardening always match at assembly.

Write for a copy of the "HARDSTEEL" Operators Manual showing how "HARDSTEEL" drills are cutting costs in thousands of plants.

You Harden It—We'll Drill It— With "HARDSTEEL"

BLACK DRILL COMPANY, INC.

Also makers of — BLACK DRILLING UNITS — AUTOMATIC, SELF-CONTAINED — FOR COST-CUTTING PRODUCTION ON ALL MATERIALS

Write for information

wheels and abrasives, Parsons Diamond Products, Inc., West Hartford, Conn. Parsons is president and treasurer of the company. Vice-president of the new concern is Rockwell B. Ward, formerly associated with J. K. Smit & Sons, Inc., as sales representative.

New source of carbide section supply

A new source of supply of preformed carbide sections, Carbidie Inc., Latrobe. Pa., is founded and owner-operated by R. J. (Bob) Steele, Logan J. Harr and E. J. (Eddie) Reitler.



All processing rooms are air-conditioned, with the entire 4500 sq. ft. build-

Got a Minute? Got a Penny?



— any keyway from 1/6" to 1" in any bore from 1/4" to 3" — by hand with arbor press, when you're equipped with Minute Man Keyway Broach Kits.

To Cut Keyway Cutting Cost, Cut This Coupon

| The | du MONT CORPORATION, Greenfield, Mass. |
|-----|---|
| _ | IL KEYWAY BROACH CATALOG PRICE LIST T to |
| Na | me |
| Con | прану |
| Ad | dress |

ing maintained under positive pressure with filtered air. Laboratory testing is fully equipped. The shape room is designed and operated to produce accuracy in the carbide section up to 8 inch diameter and 14 inches long. Carbidie Inc. uses the Hydrostatic method of pressing, which minimizes porosity and increases transverse rupture strength of carbide.

Tap sharpening service

A new precision tap sharpening service inaugurated by Edward Blake Co. will be available to shops in the east through the company's West Newton, Mass., plant and to customers in the west through Blake's representative in San Diego, Calif.

The new service is intended to take care of the needs of customers who do not use enough taps to warrant investment in grinding machinery. Also interested, it is expected, will be large tap users who want to test the value of the Blake precision sharpening system before installing Blake grinders in their own shops.

Standard Pressed Steel Co. finishes phase of plant expansion program

Standard Pressed Steel Co., Jenkintown.





LOOK for the RED BAND

Positive overload protection! All alloy construction. Exceptional strength and rigidity; true running; no chatter. MT spring loaded live centers available for all standard tapers at pre-wer prices. For example:

| No. | Morse Taper | Overall | Spindle Dia | Net |
|--------|-------------|---------|-------------|---------|
| EL-100 | 1 | 521/22" | 1/2 " | \$22.00 |
| EL-200 | 2 | 51/4" | 9/4" | 22.50 |
| EL-300 | 3 | 6%20" | 13/14" | 27.50 |
| EL-400 | 4 | 85/4" | 11/4" | 36.50 |
| EL-500 | 5 | 10%" | 136" | 54 50 |
| EL-600 | 6 | 14" | 134 * | 85 00 |
| EL-700 | 7 | 1719/4" | 23%" | 210.00 |

Send for

N E W descriptive folder . . . and verified case histories of how MOTOR TOOL LIVE CENTERS have out-performed and eutlasted ALL other centers on exceedingly tough, continuous-run jobs.





Pa., has just completed a \$10,000,000 phase of a continuing program of expansion and modernization under which the firm has doubled its floor space to 650,000 sq. ft. in the last four years,

Under the expansion, half of which was in construction and half in new and modern machinery and equipment, SPS built a modern, integrated, one-roof plant on the site where there had been many separate buildings housing various production processes.



New job lapping facilities

New and enlarged facilities have been installed at Crane Packing Company's Morton Grove, Ill., plant to provide precision lapping service at economical cost. A complete range of machine sizes are available to lap work from 1/16" to 16" diameter. If necessary, surface flatness to .000011" or less and finishes to 2 micro inches on steel, stellite, cast iron, brass, aluminum, plastics, glass, ceramics, carbons, etc.

Nord opens plant in Orange, N.J.

Nord International Corp., Denville, N.J., has opened a two story plant at 449 Central Ave., Orange, N.J., where the main office will now be located in addition to the experimental and development de-

partments.
Plans are also being made to concen-



trate service upon the full line of Nord products at this location. Parts production from plants in New England, New Jersey and imports from Sweden will be assembled here.

Harold Hedstrom, president, said that a substantial amount of additional machinery and production equipment has

been installed.



Lindberg Eng., Detroit, moves to suburbs

The Detroit office of Lindberg Engineering Co., managed by Frank J. Condit, recently moved into its new suburban offices at 1220 South Woodward Ave., Royal Oak, Mich.

Hy-Pre Tool plans expansion

P. Sweeney, president of the Hy-Pro Tool Co., with headquarters in New Bedford, Mass., recently announced the completion of plans for an approximate 50% increase in the plant's manufacturing floor space. Most of the new space will house tap machinery and equipment now being manufactured especially for the New Bedford plant.

Detroit Stamping Co. completes plant expansion

Detroit Stamping Co., Detroit, Mich., recently completed the latest of their plant expansions.

The building enlargement of 11,000 sq.

INSPECTORS'and CODE SYMBOL STEEL STAMPS...



98 3/16" 98 1/4" 98 3/16" 98 5/2"

IN YOUR PLANT . . . quick

identification of inspector, company or part supplier, machine operator, shift, operation, etc.

. . . for the mark of controlled quality on your product.

YOUR CUSTOMERS recognize your inspection mark as a symbol of insured dependability.

Identification numbers from (1) to (99), inside standard $\frac{4}{22}$, $\frac{3}{16}$, $\frac{1}{16}$ and $\frac{4}{16}$ inch borders. Special sizes and symbols on request.

Write for complete Catalog NM-51.

STEEL STAMPS, INC.

147 Jos. Campau . Detroit 7

TROYKE ROTARY TABLES

- Saves fixtures and time consuming setuns.
- · Saves time in circular positioning.



CAM LOCKING TYPE ROTARY TABLES

Three sizes: 12", 15", 18".

This model is intended for die sinking, bench work, and assembly of machine units when quick rotation and positioning are required.



STANDARD MODELS WORM WHEEL OPERATED ROTARY TABLES

Five sizes: 9", 12", 15", 21".

For die sinking, jig boring, cam milling. Indispensable in wood and metal pattern shops.



HEAVY DUTY MODELS WORM WHEEL OPERATED ROTARY TABLES

Three sizes: 18", 21", 25".

These larger, heavy duty models are used for jig work, planer jobs, and on horizontal boring mills.

DIVIDING ATTACHMENTS or DRILL-ING ATTACHMENTS can be furnished

> SEE YOUR DEALER OR WRITE TO US FOR COMPLETE CATALOGS



TROYKE MFG. CO.

CINCINNATI 9, OHIO



ft. gives greater working space in shipping, storage, production and die departments, plus providing enlarged and completely modernized general offices. The precision valve stamping department has been doubled, while the tool and die department took over the former valve production area.

Thread gage inspection service

The Quality Control Corp., Dept. BB, 6572 N. Harlem Ave., Chicago 31, Ill., has announced a thread gage inspection service for plants without facilities for checking thread gages. Temperature is held constant so that vital elements of gages can be accurately controlled.

An indicator repair department rebuilds all types of indicators and indicating

gages.



MODEL H . . . AUTOMATIC CHUCKING INDEXING FIXTURE



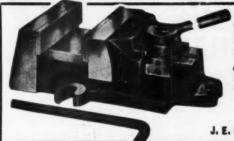
- 1880 light cuts per hour.
 Either horizental or vertical position.
 Collets changed instantly.
 Automatically knocks plees out.
 Ratshet or degree indexing—degree indexing added later if desired. Capacity !".
- acity !".
 utomatic indexer also added later
 leads F—Both degree & ratchet index
 ng. Capacity up to 2½".

Write for Folders.

J. W. DEARBORN, Ansonia, Conn.



MIDLAND AVENUE . DETROIT 3, MICHIGAN



Plunket Quick Action Vise for DRILL PRESS or MILLING MACHINE Designed for production work, using an eccentric motion to apply pressure to jaws. Eccentric motion moves jaws 5/16". Size No. 7

6" jaws, 11/2" deep, opens 4"......\$83.16 Pressure between jaws, with handle furnished, 2200 lbs. Net weight 36 lbs. Our compicts line instudes Vises for Drill Presses, Milling Machines, Shapers, Grinders

WRITE FOR CATALOG

J. E. Plunket Machine Co.

3230-32 Archer Ave. Chicago 8, III.

HORICAL SUB-PRESSES Dies for high precision work should not only be perfectly aligned but provision should be made to maintain that alignment throughout the life of the die. Our bulletin shows how it can be done.

NALTHAM MACHINE WORKS WALTHAM 54. MASS.



ARCH SUB-PRESS



It actually costs less to do a turning job on a Sheldon Precision Lathe. Machine-tool investment is cut to a fraction. Power cost is materially reduced. Less experienced operators can operate Sheldons safely and efficiently. Even cost-loadings for plant - floor space, heat and light are lower because two Sheldons can often operate in the space occupied by one large lathe.

On most "everyday" jobs a Sheldon

will actually turn out more pieces per hour too. With double V-belts to the spindle Sheldon lathes deliver enough power to take heavy cuts in direct drive, at high speeds. Sheldon's "Zero Precision" Taper Roller Bearings permit work to the closest tolerances. Seldom are such extremely accurate bearings used in moderate priced lathes.

You will actually keep more as profit if you use Sheldon Lathes.











SHELDON MACHINE CO., Inc. 4242 North Knox Ave., Chicago 41, Illinois



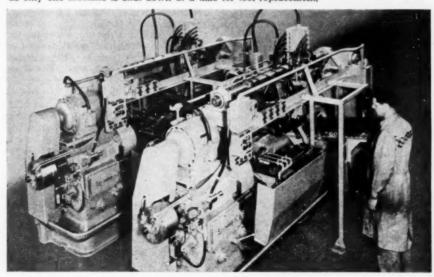
IN

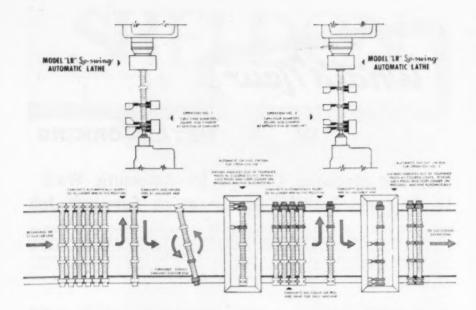
METALWORKING

Standard Machines Combine for Automatic Work Loading and Transfer Equipment on Camshaft Job

PARALLELING THE INCREASING interest in automation, Seneca Falls Machine Co., B-1, Seneca Falls, N.Y., has combined two standard 5" x 34" Model LR automatic Lo-Swing lathes, in this example of the Lo-Swing method of automatic work loading and transfer equipment as applied to a camshaft job. Each is complete with necessary tooling, automatic gaging station, work transfer and work loading equipment, conveyor lines and control panel for coordinating the movements of the loading and transfer equipment.

General layout of the machines, the automatic handling equipment and the conveyor lines. The machines are sufficiently spaced to permit easy access to the second machine for tool changing and also to allow for a bank of 20 camshafts to be accumulated on the conveyor line between the two machines. This build-up or bank of work is important as only one machine is shut down at a time for tool replacement.





Diagrams show the flow of camshafts through the conveyors, automatic handling equipment, machines, turntable and gaging stations. The rough work enters this system at the left and is processed through two machines and two gaging stations automatically. Safety and quality control devices instantly detect and signal off-tolerance pieces. The diameters machined in each of the two operations are indicated by shaded areas on the camshafts: tooling is designed for rapid replacement: front turning tools fitted with adjusting screws which are pre-set in the tool room after tools are ground; no tool setting is required at the machine; rear facing and chamfering tools mounted in magazine type tool blocks; gaging instruments indicate by means of dimensional lights whether points of inspection are oversize, undersize or within tolerance. When all diameters inspected are within the specified tolerance, the work piece is automatically released from the gaging station and deposited on the conveyor rails. If the part is oversize or undersize, the work piece remains in the gaging station and the machine, having produced the off-tolerance piece, stops automatically at the end of the machine cycle. The tool-setter then changes the cutting tool, which is signalled as faulty by the dimensional light in the gage, and releases the off-tolerance piece from the gaging station by means of a conveniently located push button. Each part is inspected immediately on leaving the machine.

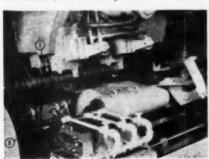
Modern automatic machine tools have attained a high degree of productive efficiency within their cycle of operation. Now industry must couple up the production flow with more efficient, less costly means of work loading and work transfer between automatic machines.

Advantages of such a production method include: (a) Elimination of operator fatigue due to mechanical handling; (b) reduction of labor and unit costs due to au-



The two switches which automatically shift control from the machine to the transfer loader equipment and back to the machine again are shown. Switch No. 1 is actuated at the end of the machine cycle, releasing the spindle clutch which stops spindle rotation and energizing the stepping switch which controls all movements of the transfer loader equipment. At the end of the loading phase of the cycle, the chuck jaws close on the work piece, thereby actuating switch No. 2, which engages the main drive clutch, starting spindle rotation and the machining phase of the cycle.

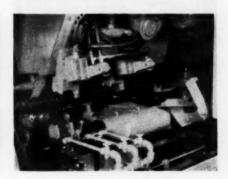
The transfer carrier has now advanced to the loading position over the centers of the lathe and a rough part (1) is ready to be loaded into the machine. A semi-finished piece (2) is still held between centers, the front and rear tool slides are relieved from the work, the headstock spindle has just stopped revolving and the chuck jaws have opened.

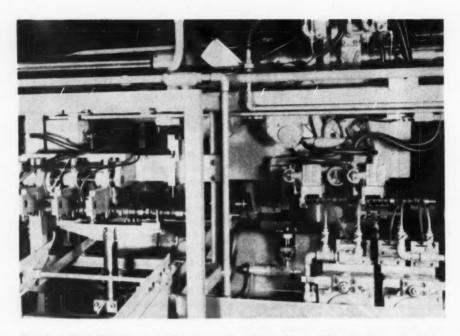




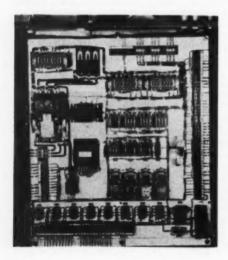
Here is a tailstock end view of the first machine showing the parts arriving on the gravity feed conveyor (1) and the work transfer carrier (2) stationed over the conveyor in the work discharge and work pick-up position. This view shows a semi-finished camshaft dropped into the turntable cradle (3) while a rough piece has been injected into the loader fingers (4) which are clamped on the work piece. The work piece (5) between centers is in the process of being turned while the loading of a rough part is taking place.

Here the transfer carrier is still stationed in the loading position and the unloader arm has reached down and clamped the semi-finished part. The tailstock spindle still holds the work between centers and the rough part is still held in the loader fingers.





This is a view from the rear of the second machine showing the transfer work carrier with both work handling arms in the relieved position and the carrier ready to return to the unloading and pick-up position over the conveyor line.



This is a view of one of the control panels which house all the electrical equipment for operating the transfer and handling equipment for the machines.

tomatically controlled machining and handling time; (c) improved quality control due to automatic gaging as each piece leaves the machine; (d) reduction in work spoilage and salvage expense; reduction in number of operators required for a production line; (f) elimination of damage to parts which frequently occurs with hand loading; (g) reduction of accidents due to limitation of human reflexes; (h) straight line conveyor feeding which simplifies plant layout.

Use ACTION Card, opposite page 64. Ensirele No. 1

New Panto-Miller

This new 2-dimensional pantograph engraver, called the Model 2A Panto-Miller, is designed for production engraving, profiling, die-cutting, and milling in steel,



cast iron, non-ferrous materials, and plastics. With spindle arm locked, it also does conventional milling.

Constructed of stress-relieved Meehanite, and equipped with precision ball

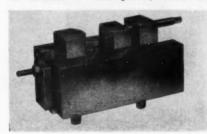
bearings at all critical points.

Copy table is $10\frac{1}{2}$ " x 16", work table 10" x 26". Johnson & Bassett, Inc., Dept. B, 114 Foster St., Worcester, Mass.

Use ACTION Card, opposite page 64. Encircle No. 2

Sliding pinch-type unit for chucks

New sliding pinch-type unit for holding thin walled parts in their "as is" position on chucks or face plates; units are



mounted in the "T" slots of a face plate or chuck, in whatever quantities and combinations are required; an inexpensive chucking setup for experimental first and second machining operations on "out-of-round" or stress relieved parts. A special floating arrangement for quick self-alignment conforms to the

A special floating arrangement for quick self-alignment conforms to the shape of the workpiece. The jaws, having a pinching action, hold the piece in an "as is" position ready for machining and also minimizes the distortion of thin walled pieces. Horton Chuck Div., The E. Horton & Son Co., Dept. B, Windsor Locks, Conn.

Use ACTION Card, opposite page 64. Encircle No. 3

Bench type Center-Mike

A new bench type Center-Mike measures center distances to .0005" tolerances—in 10 seconds flat—regardless of hole sizes, it is claimed by Sorensen Center-Mikes, Inc., Dept. B, 264 Kossuth St., Bridgeport, Conn. For production gaging of small, flat, or irregular metal components having center distances from .040" to 12.4". Contacts are set against



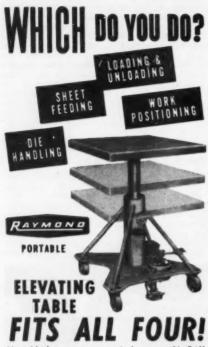
the closest points in two holes, then against the farthest points. This procedure "adds" the two dimensions between holes while the double size scale serves to divide by two to yield direct center distance reading.

Use ACTION Card, opposite page 64. Encircle No. 4

Hydraulic lathe copying attachment

All-hydraulic lathe copying attachment made by Acc-U-Mat Machine Co., Dept. B, 40 Exchange Place, New York 5, N.Y., fits any lathe of 16" - 24" swing; 3½ oz. tracer pressure; duplicating tolerances within ± .0002"; standard models available in copying lengths up to 120".

From a round or flat template, the Acc-U-Mat is claimed to be able to reproduce any longitudinal turning pattern in one uninterrupted operation, including 90°



No table has so many practical uses as this RAY-MOND Portable Hydraulic Elevating Table! Use it for positioning or handling throughout the plant . . see hew it lightens your work load. RAYMOND Hydraulic Elevating Table has sturdy 30" square top which can be rotated when desired.

Convenient foot pump simplifies raising and lowering, leaves operator's hands free. Smooth-rolling casters make table highly portable. Floor lock holds it securely in place. Standard Model elevates from 28" to 44"; Telescopic Model from 28" to 50". Both models have 2,000 lb. capacity.



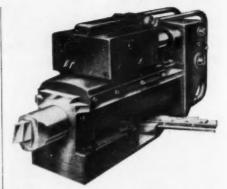
The RAYMOND CORPORATION

3737 Madison St., Greene, N.Y.

Please send me Bulletin 233 on your Portable Elevating Table.

MANE TITLE

CITY_____STATE____

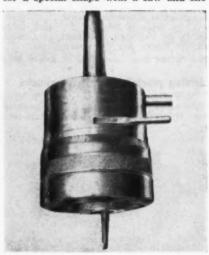


shoulders and tapered section of up to 30° decline in the tailstock-headstock direction, mounted either at the rear or front of the cross slide.

Use ACTION Card, opposite page 64. Encircle No. 5

Profiling head

This Alina profiling head is said to bore or turn practically any shape within its capacity and will, at the same time, incorporate a taper in the female as well as relief on the punch, if required; by development of molded Nylon as a templet, an operator can prepare a templet for a special shape with a saw and file



STREET ...

in minutes. The same special shape templet will produce both male and female and size the shape by increments of .0005". Bansbach Machinery Co., Dept. B, 221 N. Cicero Ave. Chicago, Ill. Use ACTION Card, opposite page 64, Encircle No. 6

Geared head, roller-hearing spindled drill press

A new heavy-duty, column-type, precision drilling machine with capacity of 134 in. in cast iron and 136 in. in steel, designated Model AB4, this rugged machine incorporates magnetic starting, in-



finitely variable control of spindle speed in both high and low range, including three automatic as well as manual feeds, and optional equipment which includes automatic tapping.

Spindle speed range is from 80 to 700 rpm, other speeds optional; automatic feeds are 0.004, 0.007, and 0.012 ipr. The No. 4 Morse Taper spindle has a travel of 6% in. Capacity for handling large workpieces is provided by the 27-in. swing. Alzmetall, Dept. B, 30 Church St., New York 7, N.Y.

Use ACTION Card, opposite page 64. Encircle No. 7

Jig borer has oversize table

Featuring an oversize, 32" x 20", hand scraped working surface and table carriage "V" ways, the Sima jig borer has a maximum accumulative error of .0006" on longitudinal and cross travel of the table. Large 61/2" dia. dials graduated in



SEE the actual operation of a Horton Chuck with the new Plastic Demonstrators.

ASK your Horton Distributor to show you Horton's Famous Five Extras, or write to . . .



Satisfaction Guaranteed Trial Offer

Anderson NEW, IMPROVED HAND SCRAPER

The new Anderson Model 5-D Hand Scraper is the kind of tool you can't appreciate until you have tried it. So here's our offer: Order as many Model 5-D scrapers as you want. We'll send them promptly. Use them a full week...if they don't live up to all your expectations, send them back to us for refund.

- Faster Cutting
- e Easier to Use
- Just the Right Spring
- Palm Fitting Grip
- Light in Weight

18" - 20" - 22" lengths

\$5.80... with high speed

\$8.50... with carboloy-

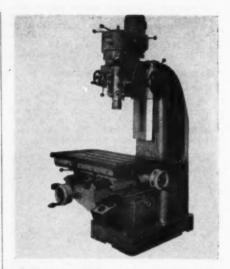
\$1.50... for rubber bumper

ORDER AS MANY AS YOU NEED MONEY-BACK GUARANTEE

Indicate choice of high-speed steel or carboloy-tipped blades, and 18", 20", or 22" lengths. We suggest you include rubber bumpers in your order. Write today!



ANDERSON
BROS. MFG. CO.
1907 Kishwaukee St.
ROCKFORD
ILLINOIS



.001" and micrometer dial verniers graduated in .0001"; 14" from spindle center line to column; spindle nose distance from table surface ranges from 0" to 20"; 16 spindle speeds from 35 to 1500 rpm. Amitool Co. 629 Main St., Westbury, N.Y., American distributor.

Use ACTION Card, opposite page 64. Encircle No. 8

Versatile toolholder

Said to perform work of 10 single purpose toolholders; handles any lathe operation, as well as planer, shaper and special equipment. Suited for use with carbide tools. Bit and holder always parallel; two openings for the tool bit run parallel to the center line of the



holder. Once holder is set up, bit can be removed for regrinding and replaced without resetting the holder. Elk universal tool holder manufactured by Acme Tool Co., 71 W. Broadway, Dept. B, New York 7, N.Y.

Use ACTION Card, opposite page 64. Encircle No. 5

Fixed center drill heads have shaved gears

United States Drill Head Co., Dept. B. Cincinnati, Ohio, has announced that all

their fixed center drill heads now have shaved gears. Results from using shaved gears are claimed to include longer gear life, greater quiet, smoother action, absolute minimum backlash for more accurate tapping, and an allowance for higher speeds to cope with present-day production methods.

These heads are shaved in a heat-treated state for greater accuracy and less deformity, and insure less downtime and maintenance. There is an automatic elimi-

> = POSITIVE **POSITIONING**



& Welding Co., Livonia, Michigan

The "Hot Shot" Bonding machine shown above was specially designed

for the production department of one of the largest manufacturers of electrical appliances when previous methods of processing their parts proved unsuccessful. The positive clamping action of eight Model 340 De. Sta. Co Heavy Duty Toggle Clamps now enables one operator to produce 3840 completed brakeshoes per 8-hour work day. Fast acting De-Sta-Co clamps hold parts firmly together during the 550° F. bonding operation.

There's a De-Sta-Co Toggle Clamp engineered for any of your work-holding problems in assembly, bonding, welding, machining or inspection. Select from over 40 fixture and portable models. Positive holding pressures up to 4.000 pounds. Write today for a copy of the De+Sta+Co catalog describing available stationary and portable toggle clamps.



nation of chatter on spotfacing, boring and trepanning operation.

Use ACTION Card, opposite page 64. Encircle No. 10

Double acting cylinders

The A. K. Allen Co., Dept. B, 59 Meserole Ave., Brooklyn 22, N.Y., manufacturers of the Allenair dial feed tables and valves, announces a new line of double acting cylinders for air, water, or l.p. hydraulic operation, available in

11/8", 2", or 3" bore, any stroke, and with either single ended or double ended piston rods.

One feature is the use of Thomson Nylined bearings and "Copper-brited" honed cylinder tubes for resistance to corrosion. Their extreme compactness as well as their ease of assembly and disassembly is achieved by the fastening of the heads, squarely and rigidly, to the cylinder tube with rectangular section, hardened steel, snap rings reground flat

FREE ASSEMBLY ENGINEERING

Our experience has found the answer to knotty assembly problems for thousands of manufacturers—large and small. We can do the same for you. Just send us prints and all the parts to be assembled. In less than a week we'll send back a sample assembly properly riveted or staked, with a complete production analysis covering tooling, set up, operating procedure, costs, with a firm quotation on the HIGH SPEED equipment designed to do the job. ABSOLUTELY NO COST OR OBLIGATION.

3 BIG REASONS

for HIGH SPEED Staker Machines' outstanding performance and trade acceptance are found in its exclusive spindle design. A built-in pressure pad, (1) firmly secures the work for the blow, (2) compensates automatically for variation in thickness and, (3) insures delivering a uniform blow. This speeds up production, improves standards, and brings rejects down to minimum. Bench and pedestal models, foot and air operated. Immediate delivery. WRITE FOR LITERATURE.



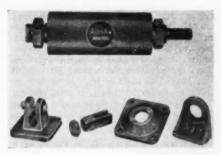
Staker Machine

Backed by the Industry's Finest Tooling Service Program

HIGH SPEED HAMMER CO., INC.

Manufacturers of HIGH SPEED Wire Strippers, Cold Riveters, Staking Machines and Precision Drilling Machines.

311 S. NORTON ST., ROCHESTER 21, N.Y.



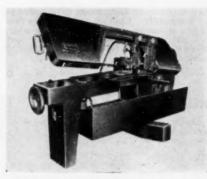
and parallel and to .001 tolerance on thickness.

Adjustable cushions are available front or back on the 2" and 3" sizes and an assortment of interchangeable foot mounts, flange mounts and clevis mounts allows for mounting in any manner or position.

Use ACTION Card, opposite page 64. Encircle No. 11

Metal cutting band saw

Kalamazoo Model 8C, a new horizontal metal cutting band saw, has been announced by the Machine Tool Division,



Kalamazoo Tank and Silo Co., 70 Harrison St., Kalamazoo, Mich.

The Kalamazoo Model 8C cuts 8-inch round stock, 16-inch flat stock, 8-inch pipe and a variety of shapes including very thin sections. It will cut with an accuracy of a few thousandths with a minimum of kerf and leaves no burr, according to the manufacturer.

Ruggedness, accuracy, operating ease and safety are features claimed. Saw frame descent through the sawing opera-

Doubly Guaranteed

BRYANT GRANITE SURFACE PLATES

NOW, users of granite surface plates can get surface plates that are guaranteed both as to highest quality of stone and utmost precision of surface.

Bryant, maker of precision machine tools and gaging equipment, joins with the world-famous Rock of Ages quarry in producing these new granite surface plates which offer unsurpassed advantages in layout, inspection and assembly work

Rock of Ages granite is unique in its exceptionally close-knit composition and flawless texture. The stone is finished on the head of the grain, a patented process.

Bryant Granite Surface Plates are economical because of their low initial cost . . . maintenance-free qualities . . . long-lasting accuracy,

Bryant unconditionally guarantees the flatness and accuracy of all Bryants Granite Surface Plates.

BRYANT CHUCKING GRINDER CO., Springfield, Vermont, U.S.A.



| COMPANY | | - |
|--|---|----|
| NAME | TITLE | - |
| Gentlemen: Pleas free folder descri Surface Plates | e send me your new bing Bryant Granite | |
| Bryant Chucking Gr Springfield, Vt. | mler Co. | BA |
| sp | ecification folder | |

tion is correctly maintained by a hydraulic mechanism. Cutting action of the saw blade is easily visible to the operator. All parts are completely enclosed and blade changes can be made in a matter of seconds.

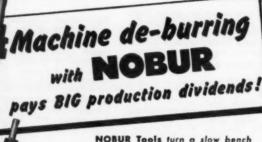
Use ACTION Card, opposite page 64. Encircle No. 12

Water-mix, cutting oil base

Dasco, a new soluble base oil, has been especially formulated for metal cutting and grinding. The manufacturer, D. A.

Stuart Oil Co., Ltd., Dept. B, 2727 S. Troy St., Chicago 23, Ill., states that because of Dasco's extra cutting value, high grinding value, stability, and resistance to rancidity, it can be used in leaner mixtures than ordinarily recommended for soluble oils. Mixtures usually start at 40 to 1 for milling, drilling, turning, boring, sawing, and reaming. Grinding mixtures leaner than 100 to 1 have given good results according to reports.

Use ACTION Card, opposite page 64. Encircle No. 13



ROBUR 10015 TUTH a slow bench operation into fast and efficient machine work! Remove burrs on multi-walled parts with a smooth, clean cutting action that won't mar highly finished surfaces. Eliminate rejects from slow, costly hand work with files, scrapers and abrasives.

Nobur Tools are used on any lathe, drill press, portable drill or flexible shaft. Operation of the double-edge cutting blade is easy and safe... no skilled help is required, and the spindle never needs to be stopped for either de-burring or chamfering.

Nobur Tools cut freely on either hard or soft metals, are simple in construction and are made in sizes to cover a full range of hole diameters. *NEW "DS" SERIES extends range of NOBUR applications to holes as small as 1/8" diameter. WRITE FOR FULL DETAILS TODAY!

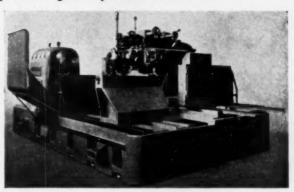


Horizontal shaver for precision gears up to 8-ft. diameter

This improved Model GCK-96 Red Ring horizontal precision gear shaving machine for spur, helical and herringbone gears from 2 to 16 diametral pitch having pitch diameters from 24" to 96" has two cutter heads that speed herringbone gear shaving operations, rapid traverse feeds on both heads which reduce setup time and redesigned controls that facilitate machine operation. The ma-chine is equipped with a flexible work driver and

crossed axes principle while mounted on their journal bearings as they will run in the equipment installation.

The machine will accommodate cutters up to 12" dia.; maximum shaving range is 111"; length from headstock to the end of the work bed is 170"; it is 240"



long, 210" deep and 129" high; it weighs approximately 150,000 lbs. An integral coolant pumping system is included with the machine.

National Broach & Mach. Co., Dept. B, 5600 St. Jean, Detroit 13, Mich.

Use ACTION Card, opposite page 64. Encircle No. 14

Save Time . . . Labor

Inside SLOTTER

Makes cuts up to 8" inside edge of sheet. Sharp, clean burr-free cuts always assured. Cap. 16 ga. High strength aluminum alloy body; H.C.H.C. blades.



Make any cut—straight, irregular, curved. Exclusive design permits turning work any direction while cutting. 4 models—cap. to 3/16".

Slitting SHEAR

New "55" Series—easier cutting with compounded linkage. 3 models—cap. to 3/16"; trimming capacity to 5/16" mild.

See your Beverly Distributor. Write for FREE illustrated







3005 W. IIIth STREET . CHICAGO 43, ILLINOIS

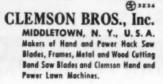


A Clemson exclusive.

You'll find it has all the high-speed cutting qualities of the original Star "Moly" High Speed Power Blades, plus being highly break-resistant. Best of all, no premium cost.

Call your Star distributor today for a trial lot of Star "Molyflex" High Speed Power Blades. Rely on him also for hundreds of the other supplies you need regularly and quickly to keep your production going.

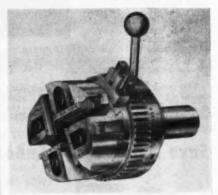
Sold Only Through Recognized Distributors.



Threading head

An improved Landmatic hardened and ground threading head has been designed for use on turret lathes, hand-operated screw machines, and automatic screw machines employing a stationary head. The 5 HH Landmatic is a stationary self-opening head, and will produce threads ranging from ¼" to ¾" in dia. Improvements in design include: A positive locking action, and greater head strength. Landis Machine Co., Dept. BB, 54 S. Church St., Waynesboro, Pa.

For the precision threading of large diameter workpieces, a six-chaser Lanco head has been recently developed. It is a



revolving die head designed for application to the new No. 4 Model "C" Landmaco threading machine and features a 2½" to 6" pipe capacity and a 2%" to 6%" bolt capacity.

Use ACTION Card, opposite page 64: Encircle No. 15

Hand-operated sheet metal rollers

Addition of six new models of a hand operated roller, said to increase the material capacity and forming width over previous models, has been announced by O'Neil-Irwin Mfg. Co., 562 Eighth Ave., Lake City, Minn.

These models, designated Di-Acro rollers, have a material capacity ranging from 16 to 24 gage sheet steel, forming width range of 12" to 42" and radius capacity from 2" to infinity.

These rollers incorporate a cam-idler feature into their design which makes it possible to form circles of any diam-



eter in two passes through the rolls.

Circles of the same diameter as the forming rolls or slightly larger can be formed in one pass through the roller by making a slight adjustment.

Bends can also be located in any position along a sheet of material being formed in the roller because the material can be fed through the rolls without bending until the cam lever is engaged. As a result, rectangles and a wide variety of snapes—with straight sections on both sides of the bend—can be produced.

Use ACTION Card, opposite page 64, Encircle No. 16

2½" spindle horizontal drilling, boring, milling and tapping machine

British Industries Corp., Dept. BB, 164 Duane Street, New York 13, N.Y., announces a new Kitchen & Wade 2½" spindle horizontal drilling, boring, milling and tapping machine.

This machine has a spindle which is 2½" at its least diameter, and will feed out 30". It is supplied with 36 speeds from 8½ to 800 r.p.m. Eight rates of power feed from 36 to 150 cuts per inch are provided, and a large friction clutch on the saddle permits stop, start and reverse at any speed. The saddle has a centralized control with all speed and



All-purpose
Centrifugal Pump Unit
No. H-2-3308A for
90% of machine tool
applications



Gear Pump Unit No. SG1-4-25A Ideal for single spindle drill presses and small lathes

See how GRAYMILLS Coolant Pumps can help you

- convert to wet cutting or
- replace worn out pumps

in a matter of minutes for increased production—improved quality—and longer tool life with your present machine tools.

If you need a larger volume of coolant, cutting oils, water, solvents, etc., at low pressures, the new improved Graymills Centrifugal coolant pumps are your answer. If you need higher pressures, for heavier liquids, a Graymills Gear type pumping unit will deliver from 1 to 3 GPM with pressures up to 100 PSI. Both types will give longer, trouble-free service. efficient operation at a minimum of cost. Standard models in

1/25, V_8 , V_4 and V_2 H.P. Various tank sizes and fittings.

All standard models stocked by leading Industrial Supply Distributors for immediate delivery—or write for catalog.

GRAYMILLS CORPORATION 3721 N. LINCOLN AVE . CHICAGO 13, ILL

WEST COAST 4511 MELROSE AVE LOS ANGELES 29



ALL FE GAGES are

Made by skilled workmen from highest quality material. Constant size and continued accu-racy are assured by sub-zero treatment. Each gage rigidly inspected.

Emergency situations in your plant solved by our unusually prompt

delivery.

THE FARMINGTON ENGINEERING CO.



CUT COSTS with ALLEN Punch Press

1-Ten Power Bench Type. Powerful, Dependable, Economical.

For light work-stamping, forming, riveting, etc.-metal, fiber or other material.

Overall height $177_2'''$... Base size $8/_2''' \times 87_2''$... Die Bed $5/_2'' \times 87_2''$... Ram face $1/_2'' \times 37_2''$... Ram Stroke $3_6'''$... positive $3_6'''$ ram adjustment ... sturdy, single pin, non-repeat hand lever clutch ... V-belt drive ... weight 105 lbs. Requires only 7_6 to $7_2'$ H.P. motor. The machine of a thousand uses! Adequate for many types of work now done on large presses at greater expense.

30-Day Money-Back Guarantee, Order TODAY, Price \$97.50 P.O.B. Clinton, Mo. (Includes Motor bracket, V-belt, motor pulley, less motor).

ALLEN, Dept. MTB, CLINTON, ALVA



MILWAUKEE SURFACE PLATES

THE KEYNOTE TO ACCURATE MEASUREMENT

Over twenty years of experience gives you "proved" performance — added assurance of quality production. Milwaukee Surface Plates, Angles, Parallels and Straight Edges are all made of the highest quality semi-steel and finished to exact dimensions

WRITE TODAY FOR YOUR FREE CATALOG

J. C. BUSCH COMPANY

Engineers and Machinists Since 1907 165 S. BARCLAY ST. MILWAUKEE 4, WIS



CLOSED



CLOSED



All hinges shown can be furnished with special holes, cutouts and bends to blue-print in metals to suit the job.

THREE-FOURTHS OFFSET

AUTO MOULDING & MFG. CO. 1110 E. 87TH ST. CHICAGO 19, ILL.

SPECIFICATIONS. Open width %" to 6" Gage Material .040 to .125 Pin Diameter .101 to 1/e Longths to 120"

SEMI-OFFSET

feed changes under the operator's immediate control. It is ball bearing throughout with nickel chrome change gears. All locking motions are operated on the saddle. There is an automatic trip for depth drilling.

The column, which is of sturdy box construction, is on ball bearing rollers with long bearings. The machine is equipped with quick power traverses in all directions, push button operated on

the saddle. Machine can be supplied either right hand or left hand.

Guaranteed to drill from the solid in mild steel and to bore up to 24" diameter, these machines can be equipped with a large variety of work plates including shallow or low base plates, deep or box base plates, revolving work tables either plain or with in and out traverse, or with special work fixtures to suit a

There's a reason 71%*

of all popularly-priced Tool and Cutter Grinders sold in 1953 were "Knock - Outs"



REDUCE Set-up Time and the need for expensive jigs & fixtures

HART MILLING FIXTURES

"Masters of A Thousand Set-ups"

Write for illustrated Folder

Value proved by years of use. WALTER W. FIELD & SON, INC. 39 Hayward St., Cambridge 42, Mass.



Precision





Thread Reliefs
"O" Ring Greaves
Snap Ring Greaves

IN 11 SIZES—No. 6 to 1"

INTERNAL GROOVE GAGES

- Greater Accuracy
 - Faster Operation
 - · Easier Reading

Positive Accuracy assured with readings to less than ± .0001—Faster, easier readings with large 2" Indicator Dial. Ranges from .300" to 6.000"—Inreach to 30". Simple setting with outside micrometer or gage blocks. Lightweight. WRITE TODAY!!

RIMAT TOOL Dept. MB-1, 21 Dayton Street

COMPANY Pasadena 2, Calif.

You Need an Extra Hand Now to Speed Up Production!

HEIMANN TRANSFER SCREW

Here is the faster, more precise way of transferring open and blind screw holes-make savings in "wage-dollars-per hour" of your expensive hands on every job. A die-and-tool maker's tool with many other applications for die makers and machinists. A set of 6 Hardened Screws nested in combination holder and wrench—no other tools needed. Get more work now-save money tool

HEIMANN MFG., CO. URBANA.

HIGH SPEED or CARBIDE .

For MASS PRODUCTION

FOR HOLES FROM 1/16" UPWARD 17 DIFFERENT SIZES

Write For Complete Data

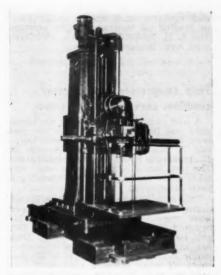
LAPPED CUTTING EDGES FOR BETTER "BORES" AND FASTER FEEDS

- . FAST PERFORMANCE
- . ECONOMY IN PRODUCTION
- . EFFICIENT IN RESULTS

Dealers! Here's Profit-Maker!

Tool Co.

738 MT BROADWAY NEW YORK 3, N.Y.



particular job. They can also be supplied in other spindle sizes from 1½" to 4".

Use ACTION Card, opposite page 64. Encircle No. 17

Rotary stock stop ends marring, cuts machine wear

Use of a live head which rotates freely on the stock stop during screw machine and turret lathe operations is claimed to completely eliminate marring of the finished end during stock feed. Particularly useful in working brass, aluminum and other soft materials; unusually large sizes and special designs are made to specifications. Barnaby Mfg. Co., Dept. B, 74 Knowlton St., Bridgeport 8, Conn.



Use ACTION Card, opposite page 64. Encircle No. 18

The merican Line of Cold Pipe.

LINE OF COLD PIPE, CONDUIT AND HEAVY WALL TUBE BENDERS HAND AND POWER

ONE OF 10 HAND-OPERATED TYPES



AMERICAN TYPE 2PBR



Designed for power application to employ the Type A-30 Mand Bender. Bendes 16 10 2° Pipe at Radii appreximately 5 times pipe at Radii appreximately 5 times pipe at 20 pt to 2° Pipe at 20 pt to 20 pt to

pipe size. Standard moter equipment 2 H.P.



COMBINATION BENDING TABLES

For hot or cold bends of various shapes, pipes, bars, etc. 5' sq.; 7' sq. (3½' x 7' pairs) suitable for welding together. Other sizes or custom made to your specifications.

AMERICAN PIPE BENGING MACHINE CO., INC. 9 Furnace Street, Poultney, Vermont

Wire, ribbon stock reels

The Nilson tilting wire and ribbon stock reel is designed to provide a simple, economical method of loading heavier coils of wire or ribbon stock, without additional overhead material handling

equipment. It is portable. One man loads and operates unit; automatically locks in loading as well as upright position. The A. H. Nilson Machine Co., 1511 Railroad Ave., Bridgeport 5, Conn.

Use ACTION Card, opposite page 64. Encircle No. 19



Twin compressor tank sprayer combines convenience and power

A new portable tank sprayer for home, shop and light commercial use has just been introduced by W. R. Brown Corp., 2651 N. Normandy Avenue, Chicago 35, Ill., makers of Speedy Sprayer equipment. The new model (450) features easy mobility plus extra power provided by a twin compressor.

This new compressor is of the Brown multiple diaphragm type and is equipped with oversize ball bearings that are lubricated for life in the factory. Its 11½ gal., heavy welded steel air-storage tank has an automatic pressure switch—starts motor when pressure drops to 30 lbs.; shuts off when pressure reaches 45 lbs.; pressure gage indicates operating pressure; twin compressors deliver four cubic

DELIVERY from STOCK

STANDARD CIRCULAR FORM TOOL BLANKS

(Made of High Speed Steel) Soft or Hardened

| | No. 00 | B. & S. | No. 0 | B. & B. | No. 2 | B. & S. |
|----------|--------|----------|--------|----------|--------|----------|
| Widt | Soft | Hardened | Soft | Hardened | Soft | Hardened |
| 1/4" | \$1.00 | \$1.50 | | | | |
| 5/16" | 1 10 | 1.60 | \$1.75 | \$2.20 | | |
| 3/8" | .26 | 1.70 | 1.98 | 2.40 | \$2.80 | \$3.50 |
| 7/16" | 1.30 | 1.80 | 2.05 | 2.60 | 3.00 | 3.85 |
| 1/2" | 1.40 | 7.00 | 2.20 | 2.80 | 3.20 | 4.20 |
| 9/16" | F.50 | 2.20 | 2.35 | 3.05 | 3.45 | 4.50 |
| 5/8" | 1.65 | 2.40 | 2.50 | 3.30 | 3.70 | 4.56 |
| 11/16" | 1.80 | 2.60 | 2.65 | 3.55 | 4.00 | 5.40 |
| 3/4" | 2.00 | 2.80 | 2.80 | 3.80 | 4.30 | 5.80 |
| 13/16" | 2.20 | 3.00 | 2.95 | 4.00 | 4.60 | 6.20 |
| 7/8" | 2.40 | 3.26 | 3.15 | 4.20 | 4.90 | 6.60 |
| 15/16" | 2.60 | 3.60 | 3.30 | 4.40 | 5.20 | 7.00 |
| 1" | 2.86 | 3.80 | 3.45 | 4.70 | 5.50 | 7.40 |
| 1- 1/16" | | | 3.60 | 5.10 | 5.85 | 8.00 |
| 1- 1/8" | | | 3.75 | 5.80 | 6.20 | 8.60 |
| 1- 3/16" | | | | | 6.60 | 9.20 |
| 1- 1/4" | | | | | 7.00 | 9.80 |



Save time and money with these steek blanks.— Also, prices on request for Blanks for other make machines or for Blanks made of HIGH COBALT STEEL.

Send for COMPLETE STANDARD TOOL CATALOG

SOMMA TOOL CO., INC.

Correction

In the 1954 BLUE BOOK Directory the heading for Firth Sterling, Inc. was inadvertently dropped from their steel listings and their products appear to be part of the listings for A. Finkl & Sons Co. The correct listings of Firth Sterling are herewith given. It is suggested to readers that they tear out this page and clip it to page 669 of the 1954 Directory.

| Special A.S.V. | WI |
|----------------|------------|
| Special XX | WI |
| Special | WI |
| Best | WI |
| Extra | WI |
| C.H.Q. | W1 |
| Sterling XX | WI |
| Sterling | W1 |
| Sterling V | W2 |
| Special V | W2 |
| Extra V | W2 |
| Silvan Star | W2 |
| Silver Star | W2 |
| Sterling M | W1 plus Ci |
| J. S. Punch | SI |
| Chimo (Mod.) | 52 |
| Chimo | SS |
| Invaro No. 1 | 01 |

| Invaro No. 2 | 02 |
|-----------------|------|
| Airvan | A2 |
| Air-Mo | A4 |
| Cromovan | D2 |
| Triple Die | D3 |
| H.W.D. No. 2 | H11 |
| H.W.D. No. 1 | H12 |
| H.W.D. No. 3 | H13 |
| L.T. Forging | H21 |
| X.D.L. | H25 |
| L.T.L. | H21A |
| X.D.M. | H26 |
| X.D.H. | H26 |
| W.C.R. | H16 |
| Star-Mo L. C. | H42 |
| Blue Chip | TI |
| H. V. Blue Chip | T2 |
| Red Chip | T4 |
| Circle C | T5 |
| F. S. 2-5 | TS |
| Hi-Mo | M1 |
| Star-Mo M-2 | M2 |
| Van Chip | M3 |
| Circle M | M36 |
| Super Hi-Mo | M30 |
| Super Mo-Chip | M40 |
| Mo-Chip | M20 |
| A. W. Special | L3 |
| Demmler D | 12 |
| Meteor | FI |
| R. T. | F2 |
| | |

feet of air per minute; ½ h.p. 110 volt 60 cycle ac electric motor with 10 foot cord and plug.

The complete unit is mounted on



rubber-tired wheels that are removable for stationary use. Rubber pads for tank feet and a removable handle with rubber grip are also included. It is equipped with a tire inflator chuck, 15 ft. air hose, No. 121 spray gun and ½ h.p. motor.

Use ACTION Card, opposite page 64. Encircle No. 20

Depressed center grinding wheels

The Carborundum Co., Dept. BB, Niagara Falls, N.Y., announces the availability of its new Carboflex depressed center grinding wheels for rough grinding, weld removal, cut-off and slotting operations for ferrous and nonferrous metals and nonmetallics.

Combining aggressive cutting action with extreme high strength and resistance to cracking, the new glass-fiber-reinforced resin bond wheels are said to



provide efficient operation with maximum safety.

Tested in foundries, steel mills and all types of metalworking and metal fabricating industries, applications in-

clude roughing-off fins and sharp edges, notching and cutting-off gates and risers, removing burned sand, cleaning castings, weld preparation and weld removal, general purpose roughing and surface grinding, cut-off and slotting.

Designed with a knurled back in addition to the knurled face, the new wheels enable the operator to cut with both sides and the periphery of the wheel without any initial dressing.

The new wheels come in sizes of 7" and 9%" in dia.; \%", 3/16" and \%" in thickness and contain a \%" arbor. Grading A24-R-BC is recommended for metal applications, and grading C24-R-BC is used for nonmetallics.

Use ACTION Card, opposite page 64, Encircle No. 21

New "hex" feed finger

Balas Collet Mfg. Co., 1557 E. 27th St., Cleveland 14, Ohio, announces a new improvement on all their two-split feed fingers designed for use with hexagon stock.

The new feed fingers have a "hex" chamfer in the back hole to enable the

Laboraving Production CHUCK

Will pay for itself in 60 to 90 days

On turrets, engine lathes, cutting-off machines, drill presses or any type of chucking machine, the Barker Two-Jaw or Three-Jaw hand operated chuck will increase production up to one third and actually pay for itself while doing it in from 60 to 90 days. Hand lever eliminates pneumatic and hydraulic systems, yet closes and locks jaws with

lathe running or stopped. Over 30 years of labor saving, production boosting operation.

Write for bulletin 201 today.



Jaws locked

THOMAS HOIST CO.

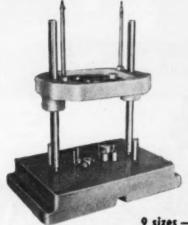


operator to be certain that the stock is in line with the "hex" in the feed finger when loading stock. Manufacturer claims this new improvement will increase feed finger life and prevent breakage by preventing "across corners" conditions when loading stock in automatic screw machines.

Use ACTION Card, opposite page 64. Entirele No. 22







5 combinations per size — for hole patterns 3" through 15" dia.

Standardization makes for quick delivery and attractive price. Only a few minor parts need be made. Speed up machining operations. The operator merely feeds the parts — the Zagar Self-clamping Drill Jig does the rest. Zagar drill jigs are now "off the shelf".

Write for Manual 8-5.

ZAGAR TOOL, Inc., 24000 Lakeland





IBM uses new 3-D magnifier. Here you see an IBM worker in the model shop at the company's Endicott, N.Y., plant using a Magni-Focuser, the new 3-D binocular magnifier, doing a filing operation on a business machine part. The binocular magnifier increases production and insures greater accuracy by providing needle-sharp magnified vision in third dimension and gives the worker free use of both hands. The magnifier is made by Edroy Products Co., 480 Lexington Ave., Dept. 14, New York 17, N.Y.

Use ACTION Card, opposite page 64. Encircle No. 23

Brown universal vertical milling head

These milling heads, made by Brown Vertical Milling Head Co., Dept. BB, 1615 Riverside Drive, Los Angeles 31, Cal., embody the full difference between the vertical milling machine and the horizontal. It is an inexpensive element that makes one machine take the place of two.

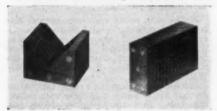
Features of the head are: Gears are hardened, helicals and spiral bevels are silent, smooth for precision work; overarm head adapter drive spindle, or cone type mill-head adaption; micrometer quill angular bore down feed is of rigid construction; easy to install in the overarm or the cone-mill adaptations; calibra-

tions hand-machine engraved for best visibility and accuracy; ball bearings are of the preloaded type, with vertical spindle preload adjustment.

Heads are available for all sizes and makes of horizontal milling machines. Use ACTION Card, epposite page 64. Encircle No. 24

Magnetic parallels & "V" blocks

Grover-Sayle Co., Dept. B, P.O. Box 6715, Cleveland, Ohio, announce the availability of a complete line of precision laminated parallels and "V" blocks. One of the outstanding features of this



line is said to be the positive mechanical lock, non-shift laminations, Materials used include spring temper phosphorous bronze for the non-magnetic laminations

and hard temper silicon bronze for the dowels. The end plates are \(\frac{1}{3} \) and are welded and ground square.

Both parallels and v-blocks may be ground or machined to whatever forms necessary to hold work which would otherwise have to be held in elaborate first war in a plate of the control of th fixtures, sine plates and angle plates. Use ACTION Card, opposite page 64. Encircle No. 25

Plastic metal has wide application

A new putty-like material consisting of fine steel powders and an extremely strong plastic has just been developed by the Chemical Development Corp., Dept. MB, Danvers, Mass. Called Devcon, it is used to make permanent and durable drill jigs, fixtures, forming dies and similar products in a fraction of the time previously required and at a fraction of previous costs. Many other additional uses are claimed, including plug gages, rubber molds, duplicating machine masters, models, prototypes, and for caulking large holes in metal castings.

Devcon is as easy to use as modeling clay, the manufacturer says. No heat or pressure is required. After the desired





Drill fixture made with Devcon. The holding section of the fixture took approximately 14 minutes as compared to an estimated 12 hours for normal machine shop procedure.

shape has been formed, Devcon becomes an extremely strong, tough and rigid metallic piece in approximately two hours. Devcon makes a precision form of the original without distortion or shrinkage. It can be sawed, drilled, tapped, threaded, and ground with conventional metalworking equipment.

A large mass can be applied to a vertical surface without running or sagging.

It has excellent adherence to steel, and has high impact, tensile and compressive strengths. If additional hardness is required., Devcon can be chrome, nickel or copper plated or metallized by conventional methods. It is light in weight, and is extremely resistant to many solvents, acids, oils, and other chemicals. It is 100% solids and does not contain any solvents; storage life is in excess of one year.

Use ACTION Card, apposite page 64. Encircle No. 26

Wade hand screw machine features mechanical reverse

Embodying many new mechanical and construction features said to save the operator's time and make his work easier, the brand new Model No. 73 hand screw machine has just been placed on the market by the Wade Tool Co., Dept. BB, Waltham, Mass.

Machine incorporates a new method of driving the headstock spindle with a timing belt. This transmission drive will eliminate many of the problems common to most drives, it is said, and will help in maintaining operating accuracy.

A feature on this machine is the new mechanical reverse, giving instant rever-

B-R-E-A-K Hand Finishing Bottlenecks

with PORTABLE • ELECTRIC RECIPROCATING TOOLS

These handy tools will cut out many tedious hand filing and finishing operations — Increase Production — Produce Uniform Work

Light in weight—Delivers 1/4" or 3/4" fixed stroke at 1000 strokes per minute—Operates on 110 volts AC or DC.

SEE THEM - BOOTH 1022



ACME TOOL COMPANY

71 WEST BROADWAY

NEW YORK 7, N. Y.



sals without disturbing the continuous forward operation of the motor. A hard-ened and ground self-centering bed has two symmetrically beveled sides, assuring balanced precision alignment of all attachments. The drive, completely enclosed in the pedestal cabinet, gives an infinitely variable speed with a top spindle speed of 3500 RPM. It is powered with a 1 HP motor. Instantaneous highlow speeds in a ratio of 5 to 1 are obtained through a clutch. The brake is provided for quickly stopping the headstock spindle. The headstock, totally enclosed, has 1" collet capacity and is equipped with bearings of the highest precision. All bearings are under a slight pre-load to eliminate deflection and yield. and to assure an extremely rigid spindle for close tolerance work.

Use ACTION Card, opposite page 64. Encircle No. 27

New features in U. S. Burke vertical miller

The United States vertical milling machine by U. S. Burke Machine Tool Div., Cincinnati Mfg. Corp., Dept. B, Cincinnati 27, Ohio, is a companion to the U. S. Burke time-tested "U. S. No. 1" horizontal miller. Many exclusive features and improvements are said to be incorporated, including balanced rigidity, simplified belt changing, conveniently mounted switch, and tool storage compartment in the base.

For vertical boring, end milling, dovetailing, etc., the machine was designed to fill an expanding need for a large-

capacity vertical milling machine which

is extremely flexible.

The vertical table provides 9½" x 36" working surface. Quill travel is 5½". The entire head is accurately balanced by mounting the motor behind the support-

Nicholson Expanding Mandrels SAVE TIME LOST **Providing Solid Arbors**

Records in many shops show Nicholson expanding mandrels actually get operations completed in less time than was formerly consumed in providing solid arbors. In cases this results in a tremendous cut in "down" time. Set of 14 Nicholson mandrels replaces 209 solid arbors. For all bores 1/2" to 7"; sold singly or in sets.



For details send for BULLETIN 653 117 Oregon St., Wilkes-Barre, Pa.

H. NICHOLSON & CO.

TRAPS · VALVES · FLOATS

COMPENSATING LIVE CENTER-



Eliminate "Cold Welding" of your center. Use the accurate, rugged, rugged *NIROL. The apring loaded

The spring loaded Live Center that compensates for expansion and contraction in high speed operations.

Write

Write for complete information.

*Reg. U.S. Pat. Off.

NIROI

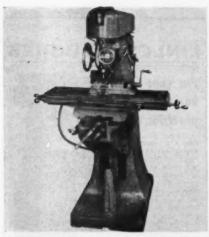
MANUFACTURING COMPANY

900 H'WAY 22, N. PLAINFIELD, N. J.









ing column. The guard (hinged on head) and motor can be easily raised to simplify the changing of the belt to any pulley

Its approximately 1600-pound weight is designed to create an extremely stable base. Floor space required is 60" x 75". Use ACTION Card, opposite page 64. Encircle No. 28

CAMS

To Your Specifications except Screw Machine Cams

Design Assistance Offered BLOOMFIELD TOOL CORPORATION 30 Farrand St. Bloomfield, N.J.

READING RENCH KEYSEATER

Portable directly to job; a time saver for both small and large shops.

3 1/4" stroke; adaptable for

other work.

Low first costprompt delivery. Good dealers wanted.

Reading Machine Co. Cincinnati 37, Ohio



STOP DUST

with DUSTKOP



300 cfm to 10,000 cfm per unit (22 models) standard, pre-tested, available from stock. Ask for catalog 605-2.

No obligation.



AGET-DETROIT CO. ANN ARBOR, MICH.



LINLEY JIG BORER

Put your small jig boring jobs on this precision machine

Here's a machine, available at extremely low cost, that will enable you to save your larger machines for larger, heavier work. You'll find it meets your most exacting requirements for precision. Get our accuracy information and you'll see what an outstanding investment this machine represents.

Table movement: 6"x10"; table size, 7"x171/2".

Send TODAY for complete information.



LINLEY BROTHERS COMPANY
663 State St. Ext., Bridgeport 1, Conn.

YOST DRILL PRESS VISE

THE GRANT MFG. & MACHINE CO.

Bridgeport 5, Conn.



This new Yost vise has been designed expressly for use on drill press operations. Does away with special and costly jig fixtures.

Offered in two sizes.

| Vise No. | Jaw, Inches | Opens Inches | Weight Pounds |
|----------|-------------|-----------------|------------------|
| 1D 2D | 31/2 | 31/2 | 121/2 |

Do you need a vise of ANY type?

Write today for bulletins on the extensive Yost line

1335 SO. MAIN STREET
MEADVILLE. PENNSYLVANIA

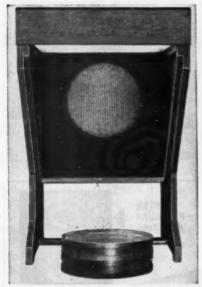


Tamms Industries, Inc. 228 N. La Salle St. • Chicago, III.

New monochromatic lamp for laboratory and shop

Acme Scientific Co., 1456 W. Randolph St., Chicago 7, Ill., manufacturer of light-wave measuring equipment, has recently developed a new large-field monochromatic lamp known as Model 700-L, specially designed for use in the laboratory or shop, where absolute interpretations of interference fringes are required.

Bench type cabinet construction features "straight-line" viewing of fringes, wherein the line of vision is perpendic-



ular to the surfaces being inspected. This is said to eliminate common errors resulting from inspection of fringes at an angular view. The new lamp is available in sizes to cover optical flats with diameters of 10", 12", 14", 16" and 20". Operates on 110-120 volt a.c. 60-cycle.

Use ACTION Card, epposite page 64, Encircle No. 28

One single unit for circular, cylinder & linear divisions

William J. Hacker & Co., Inc., Dept. BB, 82 Beaver St., New York 5, N.Y., announces the availability of a new unique dividing machine, known as Model Z-950; said to permit the graduation of circular, cylinder as well as linear verniers, scales, gages, etc., on one single unit.

Circular surfaces up to 950 mm in dia.



THEY GRIND-NOT JUST RUB!

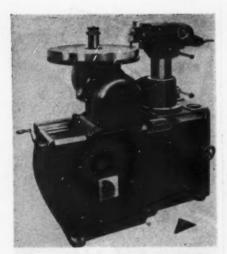
The RPM's stay up while grinding ... not only when the grinder runs idle.

It is an established fact that surface speeds must stay up to approximately a mile a minute if you want to grind...not just rub. Every mechanic knows this, but an inexperienced buyer may order tools that maintain proper grinding speeds only when running idle. The speed of Kipp air grinders drops but slightly when put to work. That means better work... longer wheel life.

MADISON-KIPP CORP.

207 Waubesa St., Madison, Wis., U.S.A.

Write for KIPP Air Tool Catalog at 3006



can be calibrated, while the equipment is capable of dividing cylinder surfaces of a maximum diameter of 1400 mm. Linear graduations up to 800 mm in length can be performed by mounting a separate dividing head upon the machine. Fully automatic, the machine is available in a production as well as in a high precision model for the machine tool and measuring 'tool industries.

Use ACTION Card, opposite page 64. Encircle No. 30

Industrial bench pressed wood tops

Shops that do very delicate or precision work require a bench with a semisoft top mounted on a solid, rigid, construction. The new industrial bench with pressed wood top is designed for such a shop. The bench top is constructed of







UNIVERSAL MILLING A

Rugged, compact design and precision manufacturing combine to make the TREE Universal Milling Attachment accurate for milling, drilling or boring . . . at any angle. Heavy duty spindle enables ¾" collet capacity. Automatic collet closer. Power feed. Eight spindle speeds. Hardened and ground spindle and quill. Enclosed micrometer depth stop.

Write for free literature describing the MH-4 Milling Head illustrated, the TREE Taper Boring Tool, the 2UV Vertical Mill and other quality TREE Tools. . .

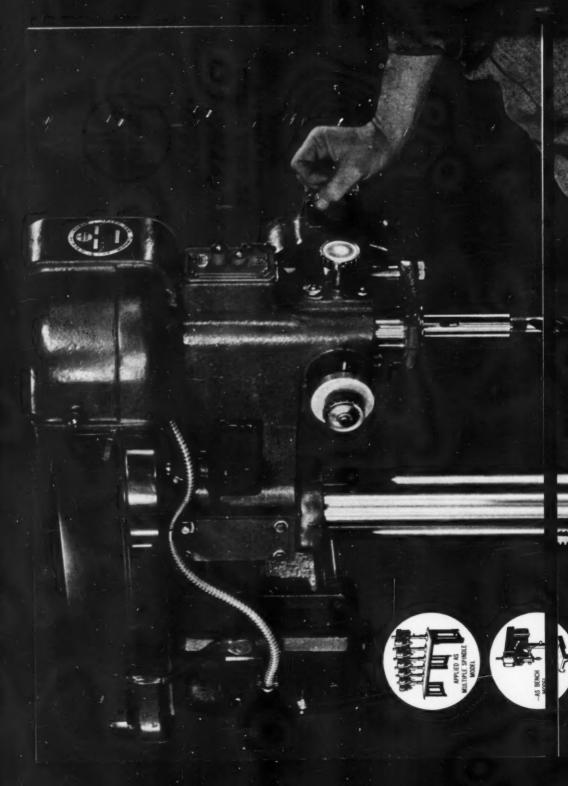


EXPORT ADDRESS: States Trading Co., 401 Brdwy., New York 13, Cable Address; "STRADESO"

TREE TOOL AND DIE WORKS

1600 JUNCTION AVENUE

RACINE, WISCONSIN





LIGHT-HEAVIWEIGHT Performance Wins New Recognition

The word is getting around about the past performance of Walker-Turner LIGHT-HEAVYWEIGHTS. A newly completed check of leading industries reveals this pertinent fact: of the 250 largest manufacturers, no less than 93% right now are Walker-Turner users.

They find in LIGHT-HEAVYWEIGHTS the features and engineering usually available only in large and costly equipment. Take this Walker-Turner 20" Drill Press, for example. It has a heavy, one-piece cast iron head; a 10-spline spindle 1" in diameter; and 4 heavy-duty, precision ball bearings—to name just a few of its fine features that make for top quality... at far from top price.

There's much more to this Walker-Turner LIGHT-HEAVYWEIGHT story that our factory-trained Distributor in your area would like to tell you. You'll find him an expert on industrial equipment, a good man to know. And he's as near as your phone. So why not call him, or write us for his name and more information—today!

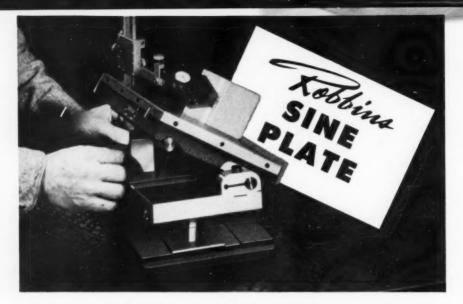
WALKER-TURNER

· DIVISION ·

KEARNEY AND TRECKER CORPORATION PLAIN PLAINFIELD, N. J.

DRILL PRESSES — Hand and Power Feed • RADIAL DRILLS Wood and Maid Curing BAND SAWS • Wood and Walson SAWS • RADIAL SAWS • JIG SAWS • LATHES • SPINDLE SHAPERS • JOINTERS BELT AND DISC SURFACERS • FLEXIBLE SHAFT MACHINES





FAST ANGULAR INSPECTION SET-UPS

... with repetitive accuracy

You can save hours of set-up time and be certain of accuracy on all your angular inspections with Robbins Sine Plates.

Any desired angle (single or compound) can be quickly and easily set up by using standard gauge blocks. Referring to the handy table that is supplied with each unit, it is simple to select the proper blocks.

Robbins Sine Plates are made of hardened steel, built to commercial precision tolerances on the sine bar method. Gauging surfaces are ground and lapped with tapped holes in the top plate to clamp the work piece. Thousands are in daily use.

Get complete details on Sine Plates and other Robbins precision engineered products. Write for your free illustrated catalog and price list today.

OMER E. Kobbins COMPANY

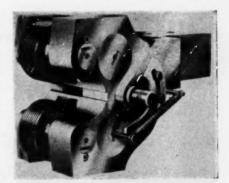
1/8" Masonite, cemented to the steel top by a special adhesive known as D-253. This adhesive is characterized by an exceptionally high resistance to load and fatigue. The completed bond is resistant to weathering and aging and does not deteriorate under normal service conditions. Industrial Bench & Equipment Mfg. Co., Inc., Dept. B, 98 South St., New Britain, Conn.

Use ACTION Card, opposite page 64. Encircle No. 31

Lanroll attachment for precision thread rolling on automatics

Important new principles to provide economical thread rolling to Class 4 limits are claimed to have been incorporated in the improved Lanroll attachment for application to automatic screw machines, made by the Landis Tool Co., Dept. B, Waynesboro, Pa.

Features include: 1. A well-balanced micro structure of the workpiece through reduced sidewise pressures between the rolls and threads produced; 2. Low gear-tooth and thrust-bearing loads; 3. Thread rolling solid to the shoulder with no danger of roll damage; 4. Longer roll life



as rolling wear is distributed equally between the two rolls; 5. Precision rolling of coarse pitch threads to Class 4 limits without drunkness.

The attachment is furnished in two sizes: the No. 18 to permit rolling of No. 5—44 pitch to ½"—13 pitch threads up to 13/16" in length; and the No. 20 attachment for rolling ¾"—24 pitch to 1"—8 pitch threads up to 15/16" in length.

Use ACTION Card, opposite page 64, Encircle No. 32



'Special Machine Tool Builders"



Illustrated above is a Model 4M unit with spindle travel of 6" and 120 r.p.m. This unit has a $6\frac{1}{2}$ second duty cycle.

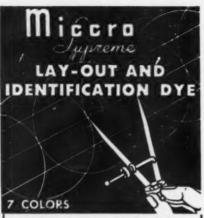
For detailed information rogarding the application of the Fen Automatic Wrench to your machines, phone, wire or write.

Do you want a compact, self contained wrench to operate gripping fixtures on your machines? If so, contact the:

FEN

MACHINE COMPANY 28914 Lakeland Blvd.

Box 274 Wickliffe, Ohio



For Tool, Die, Pattern or Template layout on metal . . . Quick identification of bar stock, sheets, strips or parts . . . Shows up in sharp relief—dries instantly . . . Write for sample and circular on company letterhead.

MICHIGAN CHROME & CHEMICAL COMPANY

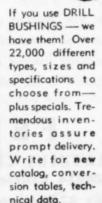
8615 Grinnell Ave. . Detroit 13, Mich



Larger StocksFaster ServiceMORE REASONS TO SPECIFY ACE



ACE DRILL BUSHING CO., INC 5407 Fountain Ave. Los Angeles 29



HYDRAULIC PRESSES



1½ to 75 ton Capacity

Send for Catalog Showing Complete

GREENERD ARBOR PRESS CO.

Strasmann-Enke double table rotary surface grinder

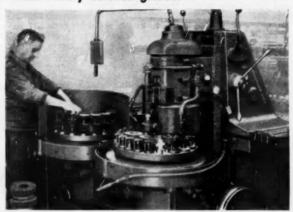
This grinder, made in Germany, has two rotary magnet tables carried on knees in front of the bed. Sliding on top of the bed is a grinding head with vertical spindle.

The grinding head is traversed by power over each table in turn. One table can thus be unloaded and reloaded while work is being ground on the other table.

The headstock spindle is shifted hydraulically into grinding position. Each knee is equipped with a large handwheel with easy to read calibration. Rotary tables are brought into contact with grinding seg-

ments by these handwheels.

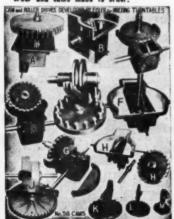
Automatic feed range from .0004" to .0004" per turn of table is provided; coolant unit is beginning to work with rota-



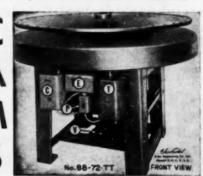
tion of table and stops automatically when table ceases to rotate; the rotary tables have a speed of max. 75 rpm; a grinding precision of .00012" to .0002" at highest surface is claimed: maximum

INDEXING TURNTABLES AND POSITIONERS

Elsier makes over 100 different types for welding, brazing, soldering, spraying, glass insulators, melting and glass glazing, with rotating stations and metorized or hand operated. Retating tables of all kinds for over 33 years. We supply any part or semplete equipment and we make special turntables to your order and came made to order.



A SPECIALIZED CAM MILLING SERVICE, SPOT AND BUTT WELDING



DR. CHAS. EISLER M.E., PRES.
EISLER ENGINEERING CO., INC., 762 So. 13th Street, Newark, N. J.

table speed 328 feet per minute; working tables can be tilted plus/minus 3°; made in 2 sizes with 20" diameter rotary tables and 24" rotary tables. Hancor Inc., Dept. MB, 262 Mott St., New York, N. Y.

. Use ACTION Card, opposits page 64. Encircle No. 34

Improved Dumore Series 9 handgrinder

Intended primarily for heavy-duty production jobs, the new Dumore Series 9 is recommended for cleaning casting and weld seams, spark testing steel, polishing and grinding heavy and irregular work. Chuck, ¼" capacity, is furnished for use with mounted wheels in grinding tight spots, radii, die moulds, etc.

The Series 9 is said to be powerful,



compact and well balanced. New rifletype handle grip provides easy, fatigue-less operation. A 1/4 hp continuous-dutyrated universal motor develops 15,500 rpm. Available for 115 or 230V, DC or AC, 0-60 cycle operation. Weighs 6 lbs. 14 oz. Three precision bearings are seated in steel inserts cast into grinder housing. The Dumore Co., 1337 17th St., Racine, Wis.

Use ACTION Card, opposite page 64. Encircle No. 35

Small air control valve

An envelope sized air control valve measuring 5" x 214" x 2" and weighing 21½ lbs. is said to be capable of operating at 800 or more cycles per minute. May be mounted directly on welding guns.



alder TOTALLY GRINDERS

"Sealed for life" ball-bearings

Special Carbide Tool Grinder

BALDOR Grinder No. 500-- built especially for sharpening carbide tools quickly and accurately. Reversible ½ h.p., capacitor type Baldor motor; heavy shaft, large ball-bearings. Dynamically balanced armature. Motor withstands repeated overloads. Protractor at each end of grinder. Complete as shown at right, \$149.20





★ ASK FOR BULLETIN 321-H

We build a complete line of bench and pedestal type Grinders-all have totally enclosed dirt-proof, splash proof motors.

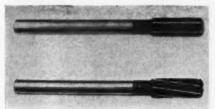
BALDOR ELECTRIC Company 4368 Duncan Ave. ST. LOUIS 10. MO.

small jigs and fixtures, small bench machines, and similar equipment. Ross Operating Valve Co., Dept. MB, 108 E. Golden Gate Ave., Detroit 3, Mich.

Use ACTION Card, opposite page 64. Encircle No. 36

Expands reamer size range

Chucking reamers made by Chicago-Latrobe Co., 411 W. Ontario St., Dept. BB, Chicago 10, Ill., are now available as regulars in fractional sizes: Spiral flute, straight shank, in 64th sizes from 5/64" through 31/64". Straight flute, straight shank chucking reamers in fractional sizes: 3/64" through 31/64". Wire gauge sizes: No. 1 through No. 6 inclusive. Letter sizes: A through Z inclusive and decimal sizes: .124 to .501.



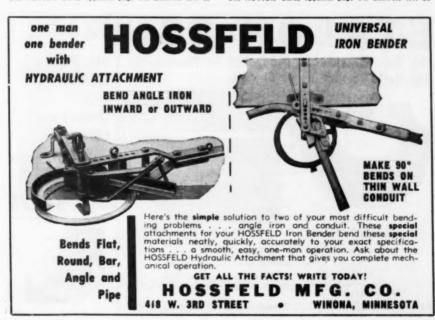
Use ACTION Card, opposite page 64. Encircle No. 37

New line of commercial accuracy blank granite straight edges

A new line of commercial accuracy black granite straight edges in lengths up to 72" has been developed to supplement the super precision straight edges manufactured by Collins Microflat Co., 2326 E. 8th St., Dept. BB, Los Angeles, Calif.

Surfaces of these new straight edges are finished to an accuracy of 0.0002" per foot, whereas surfaces of Microflat super precision straight edges are finished down to 50 millionths overall. However, for the majority of commercial applications many shops do not require extreme accuracy and find that 0.0002" per foot is adequate. These straight edges are more economical because less work is involved in producing and finishing them to 0.0002" per foot. They have the same advantages as the regular line of precision straight edges in that they are non-warping, non-deflecting, easily washable, smooth, temperature inert, rigid overall and moisture repellent. The ends are tapered and fitted with leather grips for easy, secure handling.

Use ACTION Card, opposite page 64. Encircle No. 38



General purpose precision lathe

The Hendey Machine Co., Dept. B. Torrington, Conn., is introducing a new general purpose precision lathe equipped with electronic motor control. The Hendey No. 2E is said to feature infinitely variable spindle speeds with single dial control. Speeds can be changed while machine is under cut; quietness is another

The electronic drive contains only three 18 amp, heavy-duty rectifier tubes in the power circuit, and one smaller rectifier tube in the control circuit. Positive, noslip belt drive is provided between motor

and work spindle. Stepless speed, ranging from 15 to 1500 r.p.m., is provided by potentiometer control of both field and armature of the 5 h.p., dc motor. Close speed control is achieved even under changing load. Full torque is attained at low speeds over the complete armature control range by means of i.r. compensa-

Use ACTION Card, opposite page 64. Encircle No. 39

"Instant-Action" vise for clamping compressible materials

A new series of Instant-Action Grip-Master vises that permit clamping of compressible materials normally requiring slow-action screw-type vises, is now

being introduced by Heinrich Tools, Inc., Dept. B, Racine, Wis.

Termed the "PA" Series, and featuring patented "Pumping Action" locking mechanism, four new models with 3", 4", 6" and 8" wide jaws are available, as an addition to the standard SV Series.

All Grip-Master vises advance the jaw forward against the object to be held with the initial downward press of the locking lever, exerting holding pressures up to 1,500 lb. In the new "PA" series,

ETALON 23c

The Only Micrometer Graduated in Thousandths And Half-Thousandths Of An Inch



A. Half-thousandths graduations on thimble allow tenths readings with only 5 Vernier graduations.

A. Half-thousandths graduations on thimble allow tenths readings with enry 5 Vernier graduations.

B. Deep, machine divided graduations en both thimble and barrel assure saay reading under most lighting conditions.

Forged Frame,
Heavy Duty Tungsten Carbide measuring faces, optically lapped.

Quick acting positive lock.

Feather touch friction stop eliminates wear, assures sensitive "feel".

Dull shrome finish on thimble and barrel eliminates glare.

ASK YOUR DEALER or write:

ALINA CORPORATION, 401 Broadway, New York 13, N.Y.

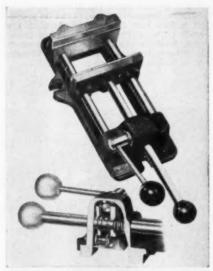
Reads to .0001 of an inch

ONE PIECE-STAINLESS STEEL SPINDLE and SCREW

Hardened and ground from the solid.

F. O. B. New York \$18.75





releasing the locking lever to a 60 to 80 degree angle, the jaw is held against

the work with a pressure of from 200 to 350 lb., allowing an additional forward motion of the jaw by "pumping" the locking lever.

Use ACTION Card, opposite page 64. Entirele No. 40

Vibration damper material eliminates bolting

The new Korfund VPS Elasto-Rib damper, made by The Korfund Co., Inc., Dept. BB, 48-39 W. 32nd Place, Long Island City, N. Y., is a vibration isolating material; this pad-type damper adds mobility to heavy equipment by eliminating bolting to floors, yet prevents machine "walking." It does not pack down, and can be used over in new locations. Some typical applications of this versatile vibration isolating material include machine tools, punch presses, air conditioning equipment, engines and printing presses.

Elasto-rib is said to utilize the elastic and damping properties of both cork and rubber, combined to handle like a single material. It has a core of high

5" SINE PLATE - \$32.50



10" SINE PLATE \$80 Guaranteed .0002" Accuracy

 Rolls Same Diameter
 .0001"

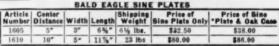
 Top Parallel
 .0002"

 Center Distance Rolls
 .0002"

 Rolls Parallel
 .0002"

Hand Scraped Roll Seats Precision Ground Double Normalized Satisfaction Guaranteed

Immediate Shipment



A

Send your order today! Prices F.O.B. St. Paul. Shipment within one working day of receipt of your order.

Bald Eagle Tool Company
Newton Building, St. Paul 1, Minn.



grade cork plate permanently bonded between two layers of oil resistant Neoprene rubber deeply grooved scientifically to increase deflection of the cushion over a wide range of loadings, and to form a non-skid surface which resists shifting or creeping of the machine.

Use ACTION Card, opposite page 64, Encircle No. 41

Abrasive belt grinder, polisher

Model F-1, a new one inch flexible abrasive belt polisher-grinder is claimed equally efficient for deburring, grinding and polishing; the 10½" throat depth permits finishing of hard-to-get-at areas. Features include: Work table and belt

platen permit accurate grinding of flat surfaces; irregular contours can be ground on a free belt by removing platen and work table; either bench or floor model with built-in dust collector. Hammond Machinery Builders, Dept. B, 1614 Douglas Ave., Kalamazoo, Mich.



Use ACTION Card, opposite page 64. Encircle No. 42



Fischer . . .

The FISCHER No. 1 Oil Groover cuts a wide variety of grooves in bearings up to 8" in length and up to 5" inside diameter. A few simple settings permit you to cut continuous, relieved, straight or spiral grooves at any angle from parallel to perpendicular to the work. Grooves may also be cut in shafts, housings, etc.

This machine will slash grooving time and deliver continuous profitable production in your shop. It will pay to find out what it can do on your grooving jobs.

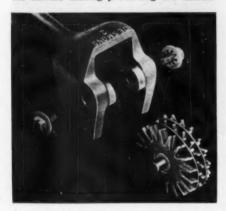
ESTABLISHED 1900 -

ISCHER MACHINE CO.

ELEVENTH and WOOD STREETS - PHILADELPHIA

Quick cutter change for wheel dresser

A complete line of Desmond-Huntington grinding wheel dressers manufactured by the Desmond-Stephan Mfg. Co., 319 S. Walnut St., Urbana, Ohio, have heavy, hardened steel side washers pressed into the handle casting protecting the handle



from wear of the revolving cutters. Hex head screws, fitted with non-removable lock washers, securely lock the side washers in place and retain the cutter pin. Either a wrench or screw driver can be used to remove only one screw for quick cutter change. A hole in the end of the dresser handle is provided for fastening dresser to grinder. This dresser is now made in sizes No. 1, 2, 21 and 22 to hold cutters of those sizes.

**Bus ACTION Card. **Despite **Despite

Direct-operating sequence valve

The newly announced line of directoperating controls by The Denison Eng. Co., Dept. BB, 1184 Dublin Rd., Columbus, Ohio, includes a complete line of directoperating sequence valves suitable for operation in circuits from 25 to 2000 psi.

The line provides precision control for inter-locked hydraulic operations, insuring close synchronization of primary and secondary operations. The pressure setting of the valve is easily adjusted. When system pressure reaches the pressure setting of the valve, the valve diverts oil to the secondary circuit.

Pressure build-up in the system brings immediate action of the pilot piston in

STOP DUSTS INSTANTLY

with

DUSTKOP

Available from stock of 32 standard models

300 cfm to 10,000 cfm

TOP: Surface Grinders, Tool and Cutter Grinders; Polishers and Buffers; Abrasive Belts and Discs; Woodworking and Plastic Industry Equipment . . . DUSTKOPS collect almost all kinds of industrial dusts.

Ask for Catalog 605-3. Describe dust problems for recommendation by return mail — ne obligation.



AGET-DETROIT CO.

502 Main St. Ann Arber, Michigan



by using Whitehead Stock Washer Dies.

1500 SPECIAL SIZE DIES ON HAND.

Whitehead makes washers and shims from any metal or special material to your specifications. Thickness from .002" to \(^3\)8".

In stock: S.A.E. standard light, medium, and heavy steel washers; brass and copper, small and large patterns; bolt sizes. Write for Whitehead's Catalog.



WHITEHEAD STAMPING CO.

1671 W. Lafayette Blvd. Detroit 16, Michigan



the secondary circuit, which may be adjusted to shift at any pressure from 25 to 2000 psi. The use of the small pilot piston eliminates need for heavy spring loading at high pressures.

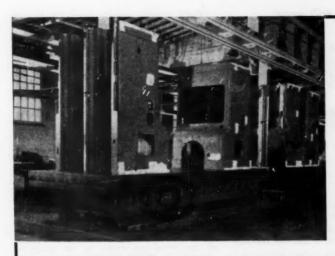
Use ACTION Card, opposite page 64. Encircle No. 44

New method for die-cut stampings

The Dayton Rogers Mfg. Co., 2830 13th Ave., S., Minneapolis 7, Minn., announces a new method of producing die-cut stampings in small lots, assuring a high degree of flatness, it is claimed.

In a number of cases, when blanks come from the blanking die, certain stresses, material brittleness (commonly referred to as stock temper) throw the blank out of flatness to such a degree





LARGE HEAVY DUTY SURFACE PLATES

ILLUSTRATED CATALOG UPON REQUEST

GOODMAN MANUFACTURING COMPANY

4834 So. Halsted Street

Chicago 9, Illinois

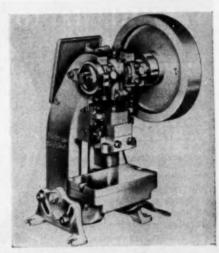
that in some cases it is not usable.

This is particularly noticeable on large blanks up to and including sizes of 6 x 12 or larger. This process of producing flat blanks is quite an advantage on stampings used in the office machine industry and other types of stampings for such equipment where the free position of flat blanks has to be maintained to a high degree of accuracy.

Use ACTION Card, opposite page 64. Encircle No. 45

9-ton bench punch press

Redesigned to rigid specifications of SR-4 strain gage analysis, using Meehanite castings, the Diamond 9-ton bench punch press, manufactured by the Diamond Machine Tool Co., 5103 Coffman-Pico Rd., Pico, Calif., is claimed to now meet stricter safety codes throughout the country. Precision engineered and with a toggle design non-repeat trip mechanism, this new press has a shut die height of 7", intermittent capacity of 11 tons, ram area 4½"x5", and bed area of 6½"x12". Standard stroke is ½" to 3" with special strokes available upon order. The press is made in plain open belt with 150 strokes per minute and back geared to 100 strokes



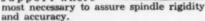
per minute. Motor recommended is ¾ h.p. with motor and motor drive arrangement extra. Net weight is 520 lbs, and overall height is 34".

Use ACTION Card, opposite page 64. Encircle No. 46

New geared-head drill press

A new, completely gear-driven drilling machine has been put in production by the I.O. Johansson Co., Dept. B, 7730 Austin Ave., Skokie,

Features include provision for fast speed changes accomplished by a simple shift of gear levers, even while machine is running. A unique spindle construction, with lower bearing located at the nose, gives support where



Quick tool changes are possible through use of the patented, built-in drill ejector, which ejects drill automatically, even while spindle is rotating. No drift or hammer is required.



Eight spindle speeds from 125 to 1540 rpm are provided through the selective gear box and 1 hp motor. The No. 3 Morse taper spindle has a travel of 4½" and drills to a center of 18" circle. With a drilling capacity of 1" in steel, the maximum distance spindle to table is 34", spindle to base 49".

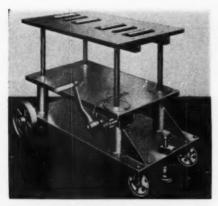
Use ACTION Card, apposite page 64. Easircle No. 47

Simplifies heavy bar stock handling

The Portelvator made by The Hamilton Tool Co., 826 S. Ninth St., Hamilton, Ohio, is used in the handling and positioning of heavy bar stock. It receives the heavy billets at the receiving dock and transports them to the stockroom where they are stored until needed. As billets are required, Portelvator moves them from the stockroom to the sawing machine where the material is height positioned and fed directly from Portelvator to saw.

The slots between rollers No. 1 and 2 and rollers No. 3 and 4 enable the chain of the overhead crane to be wrapped around the billets more securely. The table has a capacity of 2000 lbs. and has a vertical travel of 14". Minimum height from floor is 20" and maximum height from floor is 34". It is elevated by a hand crank from the side to permit the exten-





sion of the bar stock over each end. Its table surface measures 18" x 20".

Use ACTION Card. opposite page 64. Encircle No. 48

Heavy duty precision lathe

The Clausing 5300 is a new heavy-duty 12" precision lathe manufactured by Clausing Div., Atlas Press Co., 5350 N. Pitcher St., Kalamazoo, Mich.



It has 1" collet capacity, a heavy-duty No. 3 MT tailstock with tang socket, 12" swing, twelve speeds, 9" cross slide travel, and 234" tool post travel.

It has a massive headstock and tailstock, and a heavy-duty bed and carriage, for rigidity and stamina. Spindle turns on Timken "Zero Precision" tapered roller bearings. Spindle is forged, precision



ground steel with hardened nose. Both V-ways and flat ways of bed are precision ground and headstock, carriage and tailstock are hand fitted to the bed.

Other features include: built-in countershaft with friction clutch and brake, instant selection of 48 threads or feeds, automatic apron with splash lubrication, oil flinger spindle bearing lubrications steel cable V-belt drive. Specifications are: 24", 36" and 48" between centers; 12%" swing over bed, 8½" over saddle; thread range, 48—4 to 224 standard, right or left.

Use ACTION Card, opposite page 64. Encircle No. 49

Template service

A special service offering custom-made plastic templates to drafting departments has just been made available by Hermes Engravers, Inc., Dept. No. 28, 13-19 University Place, New York 3, N.Y. According to the manufacturer the templates are capable of reducing the time spent on repeat drawings of parts requiring duplication as much as 75%.

Hermes Engravers' new department fabricates plastic templates individually cut in any quantity. All templates are made according to specifications from

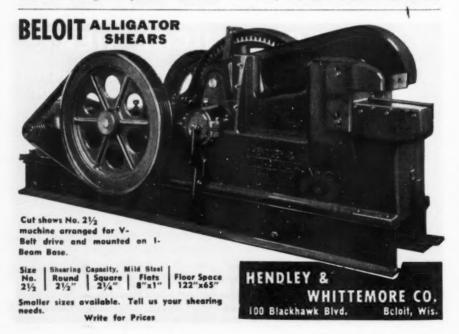


original blueprints, and are cut in .030 plexiglas with a 15° bevel for the tracing pencil to insure utmost accuracy.

Use ACTION Card, opposite page 64. Eneirste No. 50

Vibratory feeder easy on parts

The Detroit Power Screwdriver Co., 2809 West Fort St., Detroit 16, Mich., makers of power screwdrivers, special assembling machines and selective feeding devices, announces a new addition to its line, the DPS bowl feeder. This





device, based on the vibrating principle, provides fully automatic, oriented, single line feeding to grinding, packaging, inspecting and many other automatic machines and operations.

Parts that normally could not withstand tumbling, namely finished ground parts, fragile pieces, etc., are not affected by the vibrating bowl feeder.

Expanding mandrels self-releasing

Self-releasing precision expanding mandrels, being manufactured by Erickson Tool Co., Dept. B. Cleveland Ohio, are said to be precise to .0005" t.i.r. and are used wherever dimensions must be held accurately concentric with the i.d.

The smaller of the illustrated mandrels handles work ranging from ½" to ½" id. The larger is used for work starting with a 15" bore, such as: rotors, impelers, and other large, close-tolerance parts. Both larger and smaller mandrels than those illustrated are in current use.

Erickson's gripping and releasing principle, revealed in the diagram, derives its precision from the extreme accuracy maintained at each stage of mandrel manufacture.

manufacture.

The cam surfaces "M" and "N" of the alternately slotted sleeve "A" mate with corresponding surfaces of the shank within .0001". When pin "L" is drawn back against surface "C," "A" expands equally over its entire length. Relief of this force immediately relieves the mandrel's grip. In some Erickson designs a

SCHAUBLIN

toolmakers' lathes for those who demand the ultimate in precision

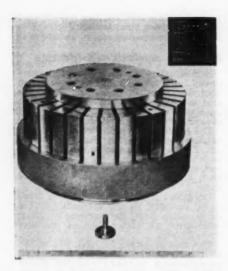
The SV 102 Height of Centers..... 4"
Distance Between Centers 17"

Largest Selection of SWISS

Precision Machine Tools in U.S. For Complete Information Write Dept. MS



CARL HIRSCHMANN COMPANY, INC., 30 Park Avenue, Manhasset, N. Y. BRANCHES: CHICAGO, WATERBURY, DETROIT, LOS ANGELES, MILWAUKEE REPRESENTATIVES IN PRINCIPAL CITIES



locknut applies the expanding pressure in_place_of pin "L."

Each Erickson sleeve expands over a range of 1/32" and each shank accom-

modates a number of sleeve sizes. Thus, each mandrel is usable for a huge variety of work.

Sleeves can also be machined to fit splines, undercuts, threads, and other internal contours.

Use ACTION Card, opposite page 64. Eneirele No. 52

Special grinder for sinks and lavatories

A special grinder, manufactured by the Gardner Machine Co., Dept. BB, 436 E. Gardner St., Beloit, Wis., grinds the back edge of sinks and lavatories on a high-production basis.

The machine base supports a heavyduty grinding head mounted on ball bearing ways and carries a 36" dia. x 3" thick Gardner Wire-Lokt abrasive disc. A centralized type of lubrication to the ways

is provided.

A long chain-type conveyor carries the sinks and lavatories past the grinding wheel, and operates at a speed of from 8 to 24 fpm. A special hold-down device supports the work during the grinding operation. A clean-up only is required, to straighten the back edge of the sink or lavatory, where it fits against a wall





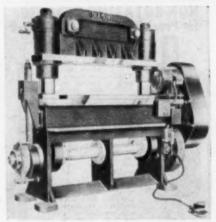
when installed; stock removal runs as high as 1/16" in some cases.

Use ACTION Card, opposite page 64. Encircle No. 53

50 ton punch press in 6 sizes

The 50 ton, Model 5036, Multi-Max punch press, in six sizes, manufactured by Diamond Machine Tool Co., Dept. MB, 5111 Coffman-Pico Rd., Pico, Calif., is identical to Diamond 30 ton presses, in construction features and engineering design, except that the former has the new type improved clutch equilibrator and also herringbone gears of heat treated alloy steel.

Standard shut die height, regardless of



stroke, is 10". Each additional inch of stroke above standard does not decrease shut die height as on conventional openback-inclinable punch presses. Shut die height above 24" is obtainable only for special applications, depending on the nature of work to be done.

Use ACTION Card, opposite page 64. Encircle No. 54

HOW SQUARE HOLED SLEEVES

One of the most difficult problems in tool making can be solved easily and quickly with Sturdy Square Holed Sleeves. The perfection of broached square holes can be had in boring bars, milling cutters and many other applications at a small

fraction of the cost of imperfect hand-made square holes. The Sturdy Square Holed Sleeve consists of a round sleeve with a perfectly square hole broached through the center. This hole is tapped at one end to receive a back-up screw which is furnished with the Sleeve. The Sleeve can be sweated or pressed into a drilled and reamed hole to make a perfectly square accurate hole in a very few minutes.

The Sturdy Square Holed Sleeve will save you many hours and many dollars in the making of boring bars, tool holders and other tools requiring square holes.

SLEEVES MADE IN FOLLOWING SIZES: 3-16, 1-4, 5-16, 3-8, 7-16, 1-2, 5-8, 3-4, 1"

STURDY BROACHING SERVICE
23516 TELEGRAPH ROAD DETROIT 19, MICH.



NON-ROTATING DRILL STOP for Precision Hole Depth Control



New you can be certain of positive control of hold depth with the WOHL-NIP Precision Drill Stop.

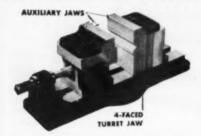
. which is Neo-Rotating. Will not mar, mark or damage the face of the work, fixture or bushing. Completely automatic, the WOHLNIP Drill Stop reduces human errors, simplifies difficult jobs, lowers machining cost, increases production and accuracy, eliminating rejects. Used for drilling, countersinking, borling, countersinking, borling, milling, routing, reaming. Used on drill presses, radial drills, uturet lathes, hand and automatic serew machines. Available as shown and with standard straight and taper shanks for any size needed.

(Patent Pending)
Write for Free Felder
with Illustrations

WOHLNIP ENGINEERING COMPANY

390 Hillside Ave. Hillside, New Jersey

SAVE SET-UP TIME



Brown Turret-Jaw Utility Vises cut production costs by eliminating time wasted on "rigging" set ups. It improves work quality because of rugged construction and ability to hold work tightly.

For complete specifications and prices write for Bulletin 23B, Brown Engineering Co., 126 N. 3rd Street, Reading, Pa.

BROWN WITH VISES

DOES IT FASTER

SIMPLEX-M ABRASIVE BAND GRINDER



The precision of a machine tool plus the durability of a workhorse. Complete with ½ H.P. Heavy Duty Motor and auto-

matic band tension control. Nothing like It for finishing metals, plastics, wood, fibre, etc.

OTHER STYLES AND SIZES IN NEW

WALLS SALES CORP.

333 Nassau Avenue, Brooklyn 22, N. Y



THREAD RING GAGE BLANKS

In Stock! Immediate Delivery!

100% guaranteed to meet the most rigid specifications of the American Gage Design Standards. Made from Graph-Mo Oil Hardening Tool Steel.

Write Today for Free Catalog

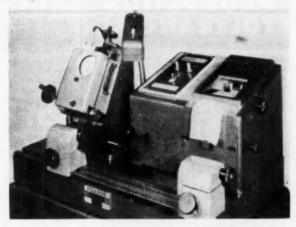
URON MACHINE PRODUCTS Inc.
6252 MONROE BOULEVARD
DEARBORN, MICHIGAN

New fine-pitch Red Liner gear checker improved

A new Red Liner with several refinements for the checking of fine-pitch gears has been developed by The Fellows Gear Shaper Co., 78 River St., Springfield, Vt. This instrument provides the type of measurement designated by the A.G.M.A. as a "composite check," by which gear errors are measured in combination.

Errors in gear tooth elements cause changes in velocity or in center distance, and the latter principle is the basis upon which the Fellows Fine-Pitch Red Liner operates. The master gear is mount-ed on an arbor in a movable spring-loaded carrier

and can be rotated either by a handwheel or by motor. It is meshed, without back-



lash, with the work which is located in a fixed holder or on fixed centers. As



WELDS LOOK LIKE WART HOGS?

GET PROTECT-O-METAL. Weld spatter simply cannot penetrate Protect-O-Metal . . . never gets a chance to make your welds look like wart hogs. Just brush or spray P.O.M. on weld area and adjacent surfaces, weld at once, then see how easily all "spatter warts" wipe off with a dry cloth. P.O.M. No. 2 causes no smoke, fumes, or odors; is non-flammable and non-toxic. One coat serves for single or multi-pass welds, costs about 1/10c per foot, saves up to 85% of weld cleaning labor. Order a trial gallon today. Satisfaction guaranteed.

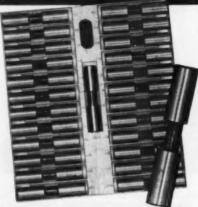
ROTECT-O-METAL

W. SMITH & SONS, INC.



5410 Kemp Road, Dayton, O.

CLOSER PRODUCTION TOLERANCES!



DELTRONIC Tenth Plug Gauges

save time and material, too! This new system of precision gaug-

ing in sets of 25 provides one gauge of nominal size plus 12 gauges of increasingly larger sizes in .0001" increments and 12 gauges of decreasingly smaller sizes in increments of .0001".

- * Size variation by ten thousandths
- * Available in increments of 1/64" from 1/8" to 1"
- ★ Set of 25 costs approximately same as Go and No Go gauge
- * Hardness is Rockwell C62/C64

For further information write Dept. D.

DELTRONIC CORPORATION 9010 BELLANCA AVENUE LOS ANGELES 45, CALIF. master and work rotate in intimate contact, any variation in center distance is measured and recorded on a constantly moving paper chart. The center distance variations are detected by an electrical sensing device whose output signal is amplified to operate an electrical recorder. By means of an easy adjustment the amplification can be made 200 to 1, 400 to 1, or 800 to 1.

When motor driven, the speed of rotation of the master gear can be varied, so that tooth velocity will be maintained at the best operating condition. The charting paper roll is also driven by the motor, and the rate of paper travel can be set for 5" or 10" per revolution of the master. The pressure between the master gear and work is adjustable to conform with the A.G.M.A. standards for measuring fine-pitch gears.

The instrument can be furnished as bench-type or with a cabinet. Headstock and tailstock centers, and a 1/10,000" dial indicator for visual inspection without a chart, are furnished as standard equipment. The headstock center is held in a "V" and can be replaced by a stationary arbor when desired.

A turret type fixture, designed for holding several different designs of gears and pinions under ½" dia., is also available. This fixture is so arranged that a gear or pinion can be loaded in an open position, and turned under the master gear to a fixed stop which locates it in the proper position for measuring.

The instrument will measure gears of 20 pitch and finer up to 4" pitch diameter, external or internal.

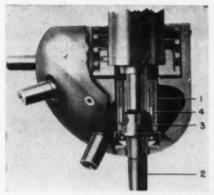
Use ACTION Card, opposite page 64. Encircle No. 55

Positive drive increases capacity of drill turret

The newly designed Flying Dutchman positive drive is said to greatly increase the capacity of the Lign-o-matic drill turret, manufactured by Howe & Fant, Inc., Dept. B, South Norwalk, Conn.

A standard feature of the new turret, the drive makes it possible to use any tool that can be held and driven by a ½ in. chuck, and is practical to perform operations well in excess of ½ in. in diameter in the hardest material.

The Lign-o-matic is a six spindle turret for use on a standard drill press. By indexing the turret, six different operations may be performed with a single drill press spindle. One can use the turret to drill, ream, counterbore, and perform other drill press operations, and also to



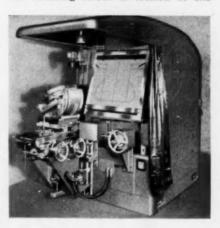
tap with reversible spindle machines. Indexing the turret is faster than changing tools or moving work to another spindle. Use ACTION Card, opposite page 64, Engirele No. 56

Comparator for inspecting slots in gas turbine discs

The Jones & Lamson Machine Co., 522 Clinton St., Dept. 710, Springfield, Vt.,

has added another to its line of optical comparators. This new comparator will inspect slot contour, angular locations, and spacing on gas turbine discs from 12" to 36" diameter.

For the convenience of the operator, the receiving screen is located at one





side of the work holding fixture and positioned vertically at eye level. All controls are within easy reach. Vertical travel of the work table is hydraulically operated with a Servo mechanism which gives finger tip control. The 30"x30" receiving screen is of sufficient size to permit the use of projection lenses of suitable areas to encompass most slots at magnifications of 31.25 or 50 times size.

The staging fixture with suitable sine bar arrangement is rigidly constructed for supporting heavy discs. It provides an accurate means for tilting the disc up to 50°, either right or left for slot angle, and up to 15° for face angle of slot to the axis of the disc.

Slot spacing measurement is accomplished with a graduated ring and vernier, Any inaccuracies in slot spacing are indicated by the relationship of the shadow of the slot to the chart outline.

Use ACTION Card, opposite page 64. Eneirele No. 57

Variable speed band saw

A new variable speed band saw having a speed range from 50 to 4500 sfm has



CHICAGO WHEEL & Mfg. Co.

Dept. MT • 1101 West Monroe Street, Chicago 7

been announced by Walker-Turner Div., Kearney & Trecker Corp., Plainfield, N.J.

Speed change is effected through a hand wheel operating a variable diameter pulley which is connected to the saw wheel through a gear train. A gear shift lever having two positions controls the high or low speed range. The low range operates at 50 to 450 sfm and the high range at 500 to 4500 sfm. Speed changes are made while the machine is running.

Due to the wide speed range of this machine it can be used on all types of

ferrous and non-ferrous metals, plastics, wood and composition. The universal application of this machine makes it an ideal installation in any shop where a variety of materials is cut.

Capacity under guide is 8", from blade to frame 16". Table tilts 45° to right and 5° to left. Motor is spring mounted in base. Motor recommendations are ¾ h.p., 1140 rpm.

Other features include new guides that support blade at point of contact and the

"RFC" ROLL-FEEDS



For side or rear feeding, All attachments for installing furnished, including disc and connecting linkage.

CAN'T SLIP

Each wedge has four points of contact to safeguard accuracy.

REVERSES INSTANTLY

Merely shift feed finger spring from one lug to the other.

FEEDS IN THOUSANDTHS

Amazingly accurate stock movement assured.

MAINTAINS ORIGINAL SETTING

Regardless of use or wear. No ratchets or pawls to wear down and "Throw off" feed spacing.

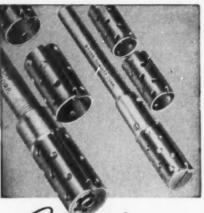
Ready for mounting! Furnished complete.

Write today for latest Bulletin. EARLY DELIVERY ON STANDARD MODELS

Roll-Feeds Corporation

Tel. Pawtucket 2-2200

PAWTUCKET, RHODE ISLAND



Boyar-Schultz Copper Head Laps

. . . . are accurate, fast working and easy to use. They are much less costly than making laps in your own tool room. Because the only wearing part is the inexpensive copper sleeve they are long lasting.

Unlike laps made for specific jobs, they are used over and over again, changing only the sleeves. Adjustment permits correct lapping size to be maintained till sleeve is worn out and replaced with a new one. Thus, with Boyar-Schulz Copper Head Laps you save tool room time and get accurate, speedy lapping.

Copper Head Laps and Sleeves are immediately available from stock, in standard sizes 1/8" to 21/2" diameters.

SPECIAL TOOL MAKERS BENCH LAP SET

Consists of seven most commonly used sizes—¼"-3/16"-¼"-5/16"-½", 7/16"-½", with enameled die cast base.



BOYAR-SCHULTZ CORPORATION 2108 Walnut St., Dept. D-L, Chicago 12, III.



machine features Carter Quick Change tires.

The new Jiffy tire is made of rubber or neoprene molded around a perforated steel backbone, with flutings on the inside circumference of the tire to effect a sturdy gripping surface.

Such design is said to permit operation of the new high-speed steel metal cutting band-saw blades and wheels at any speed desired. The tire cannot explode or be pulled off the wheel, regardless of pressure exerted, either by the blade or centrifugal force. The greater the tension put on the saw-blade, the more tightly does the Jiffy tire grip the specially machined wheel.

Jiffy tires are easily removed and replaced within but a few minutes "downtime." No special tools are required. These tires are now being used as standard equipment on several sizes of machines built by a number of leading bandsaw machine manufacturers, for use in wood, plastic and metal cutting production.

Use ACTION Card, opposite page 64. Encircle No. 58







USE NEARBY GRAINGER STOCK

Next time you need motors and other electrical items—save time and mon-ey—order from your Grainger Motor ey—order from your Grainger Motor Book. You'll get fast shipping and pick up service from your nearby Grainger Warehouse

Request on Letterhead ADDRESS DEPT. MT-1

DEALER CATALOG



118 S DAKLEY BLVD CHICAGO



in most sizes. or applied for.

SHEARCUTTER SHEARCUTTING TAP

Ends Tapping Trouble

· Produces threaded boles by a Shearcutting action . Are practically unbreakable . Ground from hardened highspeed solid blanks . Require only half the power needed for ordinary tapping . Have an amazing long life . May be resharpened many times · Feed the chips out of the hole . Lower production costs • Replace standard taps

Used by practically every large manufacturing company in the U. S. Patents received, pending

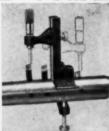
SHEARCUT TOOL COMPANY

7045 Darby Ave. Dept. MD-4b Resedo, Calif. Write for Information

SAVE

WITH BARTELT

GAGES



Use a Bartelt Pedestal Micrometer for setting boring tools and for many other shop operations requiring accurate positioning relative to fixed base. Make settings in one stepeliminate cut-and-try methods. Model B, with reversible slide, shown. Write for literature describing all models.

BARTELT ENGINEERING CO.

1218 Partridge Ave.

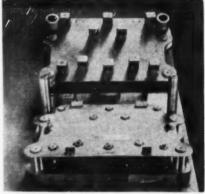
Wisconsin

Magnetic dies for perforating materials up to 1/4" mild steels

The illustrations show M12-14 introductory magnetic perforating die units, made by S. B. Whistler & Sons Inc., Dept. B, 744 Military Rd., Buffalo 23, N.Y. as they would appear on the setup bench, and the complete die in position in the press, for a sheet metal stamping completed in six piercing operations. Positioned in a 50 ton press, the die set used measures 16" x 92" over-all with a four station setup. To pierce the metal sheet according to specifications the work progresses through the four stations and then by removing the two center stations, two other templates are positioned to complete the stamping in six operations.

To make up a perforating die using the Whistler magnetic equipment, two blank templates are bored to admit the assembly of the punch and die units. Upon completion of any one job the punch and die parts are removed in a matter of minutes and the templates go to the tool crib, ready for re-use at a later date.

In the meantime, the punch and die



parts are put back to work in other templates in different arrangements. Since all punch and die parts are interchangeable, these become "stock" items and there is no "tied up" die investment.

Punch and die units are available in



PAYS for ITSELF

by sharpening just one gross of hack saw blades

Recondition your Band, Circular and Hack Saws in a Wardwell EC Combination Grinder and make them actually better than new.

The EC Grinder creates a natural cutting edge, because new blades usually are ground before hardening. The only grinder that does not depend upon the shape of the grinding wheel to form

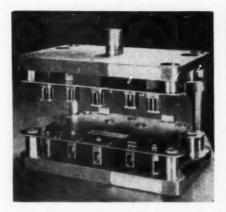
the shape of the teeth—enables you to grind a variety of blades without dressing or changing wheel.

Write for Bulletin describing the remarkable EC Grinder

Maker of largest line of saw and tool sharpening machines

MANUFACTURING CO.

3807 Ridge Rd., Cleveland 9, Ohio



standard sizes from 1/32" to 3" diameters and also in oval, square and rectangle shapes. Special sizes and shapes can be made to order.

This equipment can be used in practically any press having a minimum shut height of 9½". Dies can be made up in almost any size desired.

Templates can be changed in the press without removing the die set. Actual press down time to make such changes for an average size job is as little as 10 minutes.

Punch and die units are compact, A working area as small as 12" x 14" will accommodate as many as 25 punches and dies perforating 25 holes from 1/16" to ½" diameters.

Use ACTION Card, opposite page 64. Encircle No. 59

Torque limiting safety clutch prevents power drive overloads

This new safety device, claimed to eliminate overloads and to reduce downtime in power drives, is introduced by Centric Clutch Co., Dept. BB, Rt. 9, Woodbridge, N.J., under the name of Centric overload Trig-O-Matic clutch. It features instantaneous trigger action in torque limitation and is suited for speeds as low as one rpm as well as for high speeds.

The clutch, which provides permanent protection because of negligible wear of its parts, is easily adaptable to specific driving arrangements such as sprockets, pulley, belts, gears, etc. The operation of the clutch is simple and positive in dis-





KASSON DIE AND MOTOR CORP. Formerly General Die & Stamping Co 264 MOTT ST • NEW YORK 12, N.Y

Integrity

engagement when a predetermined overload occurs and when the clutch is reset for further running of the drive.

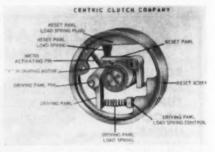
The operation centers about two pawls: a driving pawl and a reset pawl, each of which is held in place by separate springs. Compression of these springs is controlled by their own screws and plugs which permit necessary adjustments.

The driving pawl turns about its pin and engages in a "V" in the driving rotor. Proper compression of the driving pawl load spring is controlled by a screw with access on the outer casing.

The reset pawl is held on top of the driving pawl by a spring load that assists in controlling the action of the driving pawl. Adjustments of this spring are made through its plug.

When the predetermined overload occurs, the driving pawl slides out of the notch in the driving collar. The reset pawl at this point engages the driving pawl in this released position and the power drive is disengaged.

To resume operation, the reset screw is adjusted until the driving pawl is re-leased. The machine will then resume operation at the exact cycle point of release

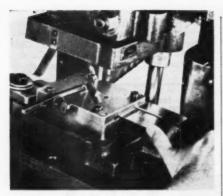


All Centric overload Trig-O-Matic clutches will run in either direction; they are all equipped with a micro-switch ac-tivating pin for use with an external micro-switch for automatic power shutoff.

Use ACTION Card, opposite page 64. Encircle No. 60

Automatic die stop features quick fit and low cost

A new type automatic and primary die stop, quickly fitted and claimed to be economical enough to pay for itself even on short runs, is being offered by Danly



Machine Specialties, Inc., 2100 S. Laramie, Chicago 50, Ill.

The automatic and primary stops and the trip spring are designed and engineered for adaptability to any die. Each part is durably constructed and the stops may be hardened if desired just after fitting.

The stop can be fitted in 10 to 15 minutes and can be used on strippers 5/16" thick and up. Made in two sizes—3/16"x5" and ¼"x6"—the stops are available for right or left hand feeding and are adaptable to blanking, progressive and compound dies.

Use ACTION Card, opposite page 64. Encircle No. 61

New fast action clamp

Clamping is effected by the wedgeclamp action of an elliptical which will not dip or bite into the plunger. The plunger is thrust against the object to be





micrometer-like adjustment to 0.0001-inch and maximum boring range.

Interchangeable shanks permit E-Z Set boring tools to be used in turret lathe, jig-bore, milling machine, boring mill, automatic or other machine tools. Because they can be adjusted for cut in only one-tenth the time formerly required by similar tools, these Maxwellmade tools can meet high-speed production on schedules.

E-Z Set boring tools are available in three models having maximum boring bar capacities of ½, 1 and 1½ inches and covering a boring range of from % to 20 inches.

Write today for catalog.

895-MC

THE MAXWELL COMPANY

220 Broadway . Bedford, Ohio

held and the desired pressure is achieved by the operator turning the handle. Full leverage is obtained instantly by manual operation and the use of a pipe wrench is unnecessary. Holding pressures range from 1500 pounds to 4000 pounds, depending on style and size.

Two models are available: Conventional C clamp design with reinforced frame, available in 4", 6", 8", 10" and 12" sizes with working pressure of 2000 pounds; tooling clamp for heavy or light duty milling machines or drill presses, made in

standard thrust sizes from 3" to 12" with working pressures of about 3000 pounds.

The clamps are made by Hallwell Tool Co., 606 Hill Street, Los Angeles, Calif.

Don't forget to mention MACHINE and TOOL BLUE BOOK when writing advertisers, or use the handy Readers' Service card on page 64.



Faster...Quieter... wide speed range, 3 sizes.

300 lb.—lift rate 75 ft. per min. 500 lb.—60 ft. per min. 1000 lb.—40 ft. per min.

Smaller . . . one man can easily install.

Safer . . . no spark hazard . . . betters all safety requirements.

More Useful... for shipping docks...refineries, chemical plants, heat treating, plating... machine shops, foundries... appliance, furniture, textile, automobile and aircraft assembly... stock rooms.

See your ARO Distributor '

The Are Equipment Corporation Bryan, Ohio

Offices in All Principal Cities In Canada—Aro Equipment of Canada, Ltd. Toronto, Ont.

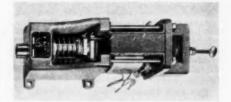


AIR HOIST

Also . . . Air Teels . . . Lubricating Equipment . . . Aircraft Products . . . Grease Fittings

Compact electric impact hammer

A new compact electric impact hammer, Electropunch, Jr., is now being introduced by Black & Webster, Inc., Dept. 75, 445 Watertown St., Newton 58, Mass., manufacturers of solenoid operated tools. Electropunch, Jr., is a packaged unit suitable for fixed, single-purpose applications where controlled impacts up to



Introducing the SWANSON



A precision bench press that makes it possible to:

Cut Die Costs 50%

This new concept in bench punch presses eliminates the use of die sets and reduces die makers' time substantially. The press itself serves as a precision

die set, and ready-made punch and die retainers eliminate making special die components. The POWER-DI unit can also be used for existing conventional dies.

Model shown can be mounted to any bench by making suitable opening for self-contained motor and drive assembly attached to lower bolster of press. Exposed working section of press takes little more room than ordinary die set. Ideal for group bench mounting. Models also available for pedestal floor mounting, and for attaching to Swanson Turret Indexing Units.

1 ton capacity -114" stroke -3" to 6" shut height adjustment -200 strokes per minute. Write for bulletin PDB,

Some other Swanson Precision Products are:
Turret Indexing Units • V-Liner Inspection Units • Feeding Hoppers
V-Liner Concentricity Checking Fixtures

V-Liner Concentricity Checking Fixtures ENGINEERS AND BUILDERS OF SPECIAL AUTOMATIC MACHINES





3500 lb. are required. It is said to be well suited for use in larger machines where a specified blow or impact is desired as one phase of the over-all operation, lending itself to automatic, semi-automatic and manual operations where speed and high production rates are required. It is suitable for staking, riveting, marking, cutting, blanking, forming and drawing of metals, plastics, fabrics, leather, etc.

The unit combines a solenoid with a mounted ram which delivers accurate,

controlled blows wherever wanted. A high temperature silicone insulated coil in the solenoid enables the unit to operate continuously at the rate of more than 100 blows per minute.

Use ACTION Card, opposite page 64. Encircle No. 63

Automatic stop easily installed

The Krasberg universal automatic stop is said to incorporate several new improvements in automatic stop devices.



THIS NEW CLAMP

will simplify and speed your operations requiring pulling action.

This new clamp—a hook clamp—may have the answers to many of your problems—specifically where tension and sustained holding power is needed.

Save physical strength and time—simplify pulling jobs. Originally developed for aircraft industry, this unusual clamp can bring help to many other industries. Maybe yours!

Don't exert human strength; do the job mechanically. You can build up a great pulling force through the toggle action of this Knu-Vise clamp—quickly and easily.

We'll tell you more without obligation. Send for complete information.

Sales offices in principal cities-Teletype DE 49



LAPEER MFG. CO.

3052 DAVISON ROAD • LAPEER, MICHIGAN
WESTERN DIVISION: 422 MAGNOLIA, GLENDALE, CALIF.
CANADIAN DIVISION: HIGGINSON ENGINEERING, HAMILTON, ONT.



Foremost among the advantages gained by the combination of these improvements is complete versatility and adaptability, Equally important is ease of installation, which can be done in a few minutes of time, according to R. Krasberg & Sons Mfg. Co., Dept. B, 2501 W. Homer St., Chicago 47, Ill.

The Krasberg stop has been developed to eliminate the necessity of handmade stops and to standardize on a stock device capable of satisfying every application. This stop, carried in two sizes, will work on any kind of die and accommodate all jobs up to the very large dies which often require custom made stops.

The Krasberg stop is attached to front of stripper with two screws and a hole drilled for arm at gaging position. Built into the stop is a spring which provides pivotal action as well as the vital side movement or "side wiggle." This feature assures proper positioning of the stop finger on the face of the work after each punching operation.

Use ACTION Card, opposite page 64, Encircle No. 64

New furnace line for calibration and instrumentation

L and L Mfg. Co., Chester 68, Pa., has introduced a new line of furnaces.—Dyna-Trol industrial electric furnaces, claiming these furnaces (up to 2,000° F and 2,300° F) will reproduce any time-temperature curve within plus or minus 3° F. The manufacturer says that many initial purchases have been made for calibration and instrumentation uses. The line consists of over 40 standard models, with

CONANT FOR BROACHES CONANT FOR FIXTURES CONANT FOR BROACH

Manufacturers Representatives in Principal Cities

SHARPENING

CONANT BROACH

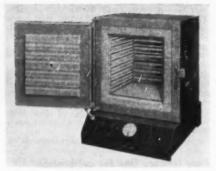
347 West 107th St., Chicago 28, III.

12" DRILLS 12"

12" LONG - 9" FLUTE HIGH SPEED STEEL

| Size | Price | Size | Price |
|-------|--------|-------|--------|
| 1/8 | \$2.06 | 21/64 | \$3.11 |
| 9/64 | 2.06 | 11/32 | 3.11 |
| 5/32 | 2.06 | 23/64 | 3.46 |
| 11/64 | 2.06 | 3/8 | 3.46 |
| 3/16 | 2.06 | 25/64 | 3.81 |
| 13/64 | 2.19 | 15/32 | 3.81 |
| 7/32 | 2.19 | 27/64 | 4.17 |
| 15/64 | 2.40 | 7/16 | 4.17 |
| 1/4 | 2.40 | 29/64 | 4.52 |
| 17/64 | 2.55 | 15/32 | 4.52 |
| 9/32 | 2.55 | 31/64 | 4.52 |
| 19/64 | 2.75 | 1/2 | 4.52 |
| 5/16 | 2.75 | | |

Eastern Tool & Supply Co.
147 Grand St. N.Y.C.



special models also available. By means of input controllers, from 8% to 100% of input is controlled. This allows for accurate equalization of vertical zone temperatures at any time-temperature curve. Once the furnace has reached the desired temperature level (between 500° and 2,300° F), it can be maintained to a plus or minus 3° F. Compensation for line voltage fluctuation is automatic.

Dyna-Trol automatic furnaces are equipped with a Cyber-Tac temperature controller to indicate hold or to cut off temperatures. It will hold or cut off temperatures to a plus or minus 2% of full scale temperature reading.

Use ACTION Card, opposite page 64. Encircle No. 65

Packaged temperature control for new furnace

Temperature indication, control and permanent record, plus completely automatic time-temperature program control for full heating and cooling range are built into the all steel control panel of this new Pereco Model FG-430 general purpose heat treating furnace, according to officials of the Pereny Equipment Co., Dept. B, 893 Chambers Road, Columbus 12, Ohio.

A Wheelco Capacilog provides continuous automatic indication, control and permanent record of all temperatures up to 2700° F. Simple, plug-in design of the instrument is said to offer an extremely flexible control system and simplify routine maintenance and service. Accuracy of the measuring system is within ¼ of 1%. Added features are the convenient external control setting, large, calibrated indicating scale, and automatic





ERIE, PENNSYLVANIA, U.S.A.

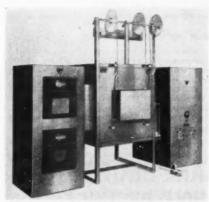


chart rewind and tear off mechanism. Controls are made by Wheelco Instruments Div., Dept. BB, Barber-Colman Co., Rockford, Ill.

Use ACTION Card, opposite page 64. Encircle No. 66

Internal comparator

The Portage Double Quick Tool Co., Dept. MB, 1037 Sweitzer Ave., Akron,



Ohio, announces the new "Interapid" internal comparator; used for internal masuring, such as inside diameters; capacity for gaging diameters from %" to 6"; adjustment made by turning the





knob in the center of the gage.

Initial setting made with gage blocks, master gage rings or micrometers. A small locking lever is provided for retracting the arms to make it easier for the gaging tips to enter the work being checked. The comparative reading on the meter-type scale shows at a glance whether the holes are over or undersize and by how much. The meter-type scale is graduated in .0005". The measuring tips being at the extreme end of the arms makes it possible to check the diameter of very shallow counterbores.

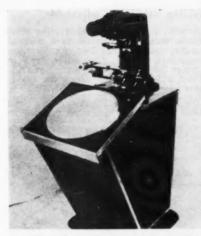
(Minimum depth 1/16".)
Use ACTION Card, opposite page 64. Encircle No. 67

New optical comparator

A new advanced design precision optical comparator known as the Model R-300 has just been announced as an addition to the line of comparators and projectors manufactured by the Portman Instrument Co., Inc., Dept. B, Town Dock Road, New Rochelle, N.Y.

The "Multi-Phase" system is one of the features, said to project an upright.





properly oriented image with exceptional definition and screen brightness. The optical system also offers the advantages of long focal lengths at every magnification providing exceptionally large working space clearance between the lenses and the object stage platform. A new indexing type lens mounting capstan is also available making it possible to instantly change from one magnification to another by a simple conveniently placed lever control. Lenses to provide magnifications of 10X, 20X, 25X, 31½X, 40X, 50X, 62½X, and 100X are obtainable as standard equipment.

Use ACTION Card, opposite page 64, Encircle No. 68

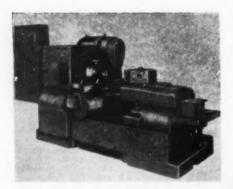
Automatic turret lathe designed for carbide tooling

This high powered automatic turret lathe, Model 4U, designed primarily for rapid removal of metal with modern carbide tools, is an 8" type A-1 American Standard spindle nose. It has been adopted for the rugged spindle, taking chuck sizes 10, 12, or 15 inches. The spindle is mounted in heavy duty, precision Timken double taper roller bearings, front and rear. Four automatic instantaneous speed changes are provided by powerful multi-disc friction clutches electro-pneumatically controlled by adjustable dogs on a dog drum. Through pick off gears, spindle speeds ranging from 45.5 to 1177 rpm can be obtained. A large magnetic clutch and brake, de-



UNIVERSAL ADJUSTABLE AND SPECIAL FIXED CENTER DRILLHEA





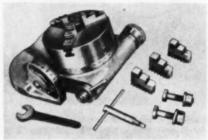
signed to give cushioned starting and stopping of the spindle, allows greater flexibility in operation. These features together with a 25 hp motor enable the Model 4U to take full advantage of modern carbide tooling, thus assuring fast metal removal on the toughest materials, according to Potter & Johnston Co., Dept. B, Pawtucket, R.I.

Use ACTION Card, opposite page 64. Encircle No. 69

Dividing head fully adjustable

A new, fully adjustable dividing head adjusts from a horizontal to a vertical position, rotates a full 360° (all precision graduated), has a fine adjustment in minutes for rotary micro setting and includes a 3-jaw, 3-step chuck for maximum adaptability.

Designated as the Panto dividing head Model DH-4, it is intended for use in



engraving, drilling, light milling, profiling and layout work on dials, cams, templates, round dies, cylindrical parts



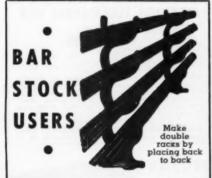
or anything requiring precise angular settings and rotary divisions of high accuracy. Overall dimensions are 7½" x 7½" x 4" high, the height of chuck in horizontal position is 3¾", the external chucking capacity is 4½" and the internal up to 4½". Net weight is 15 lbs. and shipping weight 20 lbs. H. P. Preis Engraving Machine Co., 163 Industrial Branch, Hillside, N.J.

Use ACTION Card, opposite page 64. Encircle No. 70

Mechanics Through the Ages

A collection of 63 of the more popular mechanics cartoons published in the MACHINE and TOOL BLUE BOOK over the past few years. Bound in a hard-cover it withstands constant wear.





Keep your stock handy, visible and available with Yohe racks. Save up to 75% in floor and height space. Eliminate handling accidents. Weight capacity 10,000 lbs. with 3 stands. Yohe racks pay for themselves many, many times. Send today for prices.

THE YOHE SUPPLY CO. P.O. Box 708 Canton 1, Ohio



JIG BORING

Large Precision Machining Done to your specifications

WE HAVE 13 JIG BORERS

BLOOMFIELD TOOL CORPORATION 30 Farrand St. Bloomfield, N.J.

MACHINE VISES GEM DO A BETTER JOB!





WITH SAFETY AT LESS COST Complete range of sizes. Plain, Swivel and Tilting. For Drills, Mills, Planers, Grinders, etc.

E. MARTIN MACHINE CO. SPRINGFIELD OHIO



THESE HOLES BY A QUICK, EASY, INEXPENSIVE METHOD Your business letterhead will bring literature WATTS BROS. TOOL WORKS Wilmerding, Pa.

CAM MILLING

Fully equipped modern machine shop with extensive Jig Boring, Surface Grinding and Horizontal Boring facilities as well as modern Rowbottom Com Milling equipment.

Your Inquiries Answered Promptly

HIMOFF MACHINE CO., INC. 23-22 44th Road Long Island City 1. N. Y



T-NUT & STUD SETS PUNCH PRESS SETS

SEND FOR FREE CATALOG TODAY QUARTER TURN SCREWS WLDER SCREWE DOUBLE END JIG FEET SCREW TYPE MG FEET PRESS TYPE NG FEET FLANGED NUTS **CUT THREAD STUDS** TEE-MUTS COUPLING MUTS ADJUSTABLE STEP BLOCKS STAR TYPE HAND KNOBS **HEXACON TYPE NAND KNORS** KNURLED HEAD SCREWS

118 HOLLIER AVE., DAYTON 3. OHIO

PRECISION TOOLMAKERS VISE



11/4" Jaw \$18.40 1%" Jaw \$32.95

Precision ground square and parallel to .0004/in. non-cumulative. Ground dovetailed silee, Hardened and ground jaws. Dustproof enclosed cerew. Ample clamping grooves. Excellent fer jig-boring, preci-sion grinding, Inspection. 10 day money-back GUARANTEE.

Dealer Inquiries Invited AIR TRANSPORT EQUIPMENT, INC.
Old Country Road Mineela, N. Y. Old Country Road

MOJAVE

PRECISION GRANITE

SURFACE PLATES.



Precision surface. Made from finest California black granite. The finest surface plates available. Sizes: 18"x24": \$120, 24"x35": \$240. FOB Les Angeles. Other sizes queted on request. Accuracy ,0001. Write today.

MOJAVE GRANITE CO. 1651 Miller Ave. Los Angeles 63, Calif. Since 1915

Precision grinder for full wet grinding

Thomas Prosser & Son, Dept. MB, 120 Wall St., N.Y., have announced their precision grinder-Model APW, which was developed as a result of demands of users of the dry type machines for a similar machine adapted for full wet grinding.

Advantages claimed for wet grinding are: Faster grinding without danger of

cracking the tools, better finish, and less wheel wear. The Model APW precision wet grinder is equipped with a separate motor driven coolant pump, pan set-tling tank, piping, valves, adjustable nozzles, and flexible neoprene spray guards. A copious flow of water is de-

livered directly to the tool being ground. All front, side and top angles can be set precisely in both vertical and horizontal planes, by means of protractors, accurately calibrated in single degrees, with a vernier reading to ¼ degree. As the tool is rocked back and forth across



HACK SAWS - BAND SAWS CHAND



AND SA ARE SUPERIOR!



Barnes Welded Band Saws in ARC LINE; Raker and Wavy Set and Barnes SKIP TOOTH.



LOOK AT THESE BARNES

Features ...

- Special equipment assures perfect welds.
- · Controlled anneal provides flexibility and strength.
- e Consistent quality-rigid inspection.
- Tallor-made to exact length-NO SCRAP.
- Prompt delivery from local Distributor's stock.

RNES CO., INC. TERMINAL AVE., DETROIT 12, MICH.



the wheel face, the feed of the tool toward the grinding wheel is accurately controlled by the micrometer feed knob, which is graduated in thousandths of an inch. One side of the grinder is equipped with a quick-acting indexing

table, which can be instantly set to the desired angle. Tools can be rapidly rough ground by hand on a vitrified wheel (or a diamond wheel if desired), to a slightly greater angle than the final finish angle, and then only a slight amount of grinding is necessary on the finishing wheel to obtain the exact angle, straight edge, and finish desired.

Use ACTION Card, opposite page 64, Encircle No. 71

100-ton straightening press

American Broach and Machine Co., Dept. B, 415 W. Huron St., Ann Arbor, Mich., announces a new vertical hydraulic straightening press said to have rapid advance, power pressing, and rapid return stroke. Manufactured in 75, 100, and 150-ton capacities, the machine can be supplied with a large dial-type pressure gage and remote control adjustment for relief valve setting.

The hydraulic circuit includes two separate pumping units both of which are used for the rapid advance and return stroke. Only one of the units is used to develop the maximum pressure used for the power pressing stroke. A decompression valve in the hydraulic circuit



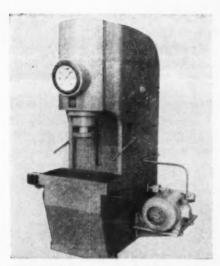
Continental CHASER AND CUT-OFF WHEEL GRINDER

Keeps tools sharp

One machine does both—it sharpens pipe thread chasers at one end—and pipe and tube cut-off wheels at the other end. Keeps your tools ready for instant use—always sharp. Also, Manufacturers of Cut-Off Machines and Wheels.

Request Circular, Today. Continental MACHINE CO.

1952 N. MAUD AVE. . CHICAGO 14, ILL.



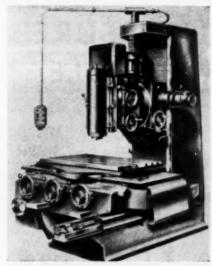
automatically prevents high pressure shock when the machine ram stroke is reversed.

Use ACTION Card, opposite page 64. Encircle No. 72

Large work table, deep throat in boring, milling machine

A swiveling column, which turns 180° horizontally in either direction similar to a radial drill, is combined with an unusually large work table and deep throat in the newly designed Bokoe No. 3 universal boring and milling machine for machining heavy cast iron and alloy steel workpieces to close tolerances. Introduced by Kurt Orban Co., Inc., Dept. B, 205 E. 42nd St., New York 17, N.Y., this massive 7½ ton machine is said to handle workpieces as large as 82" in diameter and provide a wide variety of movements which permit many different operations to be performed in one setup.

Milling head on the column swivels vertically 90° in either direction; table feeds are infinitely variable in longitudinal, transverse and rotary directions. Automatic controls on the work table provide for 28" transverse and 55" longitudinal movement with infinitely variable table feeds from 4" to 39" per min. Power feed for circular movement, infinitely variable from .7" to 70" per min., permits continuous circular milling operations; table rotates 360° with power or hand feed. Scales and verniers for table movements and miling carriage are arranged for the use of gage blocks in the production of tools, dies and fixtures.



Large milling slide movements with six mechanical feeds and rapid travel allow drilling and boring operations up to 11½" and milling cutters up to 10" diameter can be used. With a supplementary power driven rotary side table, large patterns up to 31 ft. in diameter can be milled. Depth of throat between column slide and spindle center is 37½".

Use ACTION Card, opposite page 64. Encircle No. 73



"Don't complain to me. I've told you a hundred times: hold the work in a drill jig . . . in a drill jig."

PRESSURE HANDLE



DRILL . . . QUICKLY -SAFELY-EFFICIENTLY

By adapting a Pressure Handle to your presently laborious drilling jobs, one man with a Pressure Handle can control drilling operations to a maximum, thereby, reducing labor costs, twist drill breakage and operator fatigue. By having complete control of the drilling at all times, accidents are at a minimum.

Can you drill a 2" hole in 3" stain-less steel pipe in 20 seconds? You can if you are using a Pressure Handle.

A PARTIAL LIST OF SATISFIED PRESSURE HANDLE CUSTOMERS

Bethlehem Steel
Otis Elevator Co.
Congoleum-Nair Co.
Philadelphia Navy Yard
General Electric Co.
American Badiator

Ford Motor Car Co.
Chrysler Corporation
Cadillae Motor Corp.
Timken Boller Bear. Co.
Dupont
Fruehauf Trailer
Steel

Cities Servic
Pennsylvania State Hwy.
Co.
Baldwin Locomotive Wits.
Glen Alden Coal Co.
Briggs Body Corp.
Worthington Pump Co.
Carrier Corp. Carrier Corp.
Aluminum Co. of America
Revere Copper & Brass
St. Regis Paper Co.
International Harvester Co. Armstrong Cork Endicott-Johnson Cor Jones & Laughlin Steel Co. and many more Endicott-Johnson Corp.

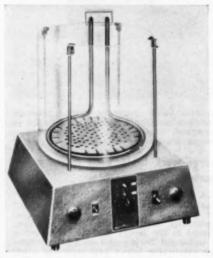
Territories open for ambitious specialty salesmen.

PRESSURE HANDLE COMPANY North State Street Wilkes-Barre, Pa.

Full visibility jar bath

The new Magni-Whirl jar bath made by Blue M Electric Co., 306 W, 69th St., Chicago 21, Ill., is said to obsolete need for any motors, stirrers or circulating systems of any type, yet provide com-plete uniformity and automatic, gentle, efficient agitation in all areas of bath irrespective of work load.

Uniformity and agitation are maintained by means of gentle pulsation of the Magni-Whirl perforated agitator plate. Plate is pulsated by a powerful electro



magnet, located in base support. Actuation of magnet is accomplished by means of selenium rectifier, capacitor, and timed relay having long-life cadmium contacts.

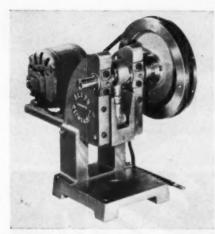
Another feature is the automatic dual Microtrol which permits automatic selection of any two most used temperatures within range of bath. Other temperatures within the range may be selected without disturbing the two preselected tempera-ture settings. Controlled sensitivity within plus/minus 0.100° C.

Use ACTION Card, opposite page 64. Encircle No. 74

Punch press for short runs

A bench model 1-ton punch press developed by Alva F. Allen, Dept. MTB, Clinton, Mo., is claimed ideal for short runs or small work because it frees heavier equipment and can be operated at lower cost.

One of the features of the Allen is a



new, simple single pin clutch. It gives positive clutching action and is operated by a convenient hand lever. On continuous operation, the Allen has a capacity of up to 200 operations per minute. One of the big savings made possible with this bench model is in the cost

of dies. Punches and dies can be made cheaply, and in instances where only a short run is necessary, tools can be made of cold rolled stock. The ram of the Allen is designed for accurate adjustment and moved on machined ways to provide greater accuracy in operation. A gib provides for take-up of any wear. The unit is operated by direct V-belt drive.

Use ACTION Card, opposite page 64, Encircle No. 75

New types of Allen screw points

The Allen Mfg. Co., Drawer 570, Hartford 2, Conn., originator of the Allen socket screw, announces two improved types of points, one applied to set screws and the other to cap screws.

A smaller cup point for set screws, called the Allenpoint, now in full production, will replace A.S.A. cup point set screws in the standard Allen line.

The new Allenpoint is said to have demonstrated greater locking at all measured installation vs removal torque pressures, uniformly high shaft holding power in torque resistance tests, unequalled performance under vibration and more complete shaft contact pattern.

The Allenpoint set screw is available





STEEL STAMPS Letters & Figures

Letters and figures deep-cut in hardened, special formula steel assure clean impressions and long service. Faces are angled for added strength.



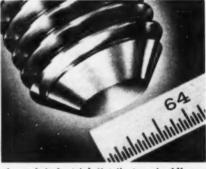


STEEL MARKING DIES

For product trademarking or identification. Any style of lettering, designs, pictures, developed from your sketch or print. Straight or reverse. For hand or press. Whenever you get calls for marking dies, write us for prompt service.

HOGGSON & PETTIS MFG. CO. 141H Brewery St., New Haven 7, Conn.





through industrial distributors, in Allenoy and stainless steel, with either NC or NF threads. The company's standard line of oval, flat, cone and dog point set screws will continue to be available as standard stock items.

Use ACTION Card, opposite page 64. Encircle No. 76

Eccentricator

A compact Eccentricator, which is said to eliminate the need for observing maximum and minimum indicator readings and computing the difference when measuring workpieces for eccentricity, has been announced by Federal Products Corp., 2512 Eddy Street, Providence, R.I.

The unit can be used for sorting to special applications, for checking runout, squareness, straightness, wobble, etc., while ignoring normal variations in size of different workpieces. This instrument, always used with suitable indicating power units either electric or electronic, is adjustable over a wide tolerance range of .0001" to .035" t.l.r. Because of its narrow ½" thickness it can be mounted 9/16" on centerline. Its tolerances are set with

Continued on page 366

AVAILABLE LITERATURE

FREE CATALOGS AND BULLETINS AVAILABLE FROM MANUFACTURERS

For copies of the literature in which you have an interest, use the postage-paid postcard on the next page. Merely circle the identifying numbers and mail the postcard.

- 1. Dial Indicator. In a recent booklet issued by Nilsson Gage Co., Inc., Dept. BB, Poughkeepsie, N.Y., the Nilcoid dial indicator is described. Features claimed are: No gear train in the new movement, increased accuracy, shockproof, lower maintenance.
- 2. Coolant, Centrifugal Pumps. A. M. Ruthman Machinery Co., Dept. MB, 1809 Reading Road, Cincinnati, Ohio, has just released an attractive, comprehensive catalog covering its complete line of centrifugal, lubricant and oil coolant pumps.
- 3. Jigs and Fixtures. Manufacturers Engineering Service, Inc., Dept. B, Security Building, Toledo, Ohio, announces a new plan to acquaint and familiarize potential users of its semiautomatic drill jigs and milling fixtures with these tools. They invite all interested shops to write for their complete descriptive literature, prices, and information describing their try-it-before-you-buy-it plan.
- 4. Leaded Steel, Brass Machining Characteristics. In "First Report," the machining characteristics of leaded steel and freecutting brass are compared; a very comprehensive booklet of 48 pages recently published by Titan Metal Mfg. Co., Dept. MB, Bellefonte, Pa. The booklet reports results of extensive closely controlled research laboratory tests on the two commercial metals, as well as results of sixmonth production runs manufacturing booster bodies out of brass and leaded steel.

- 5. Cutting Tools. A new catalog describing their Tri-Bit tools has just been issued by Weddell Tools, Inc., 37 Centennial St., Rochester 11, N. Y. Included are face and side mills with carbide tipped and high speed steel Tri-Bits. Catalog also contains data of speeds and feeds, grinding and maintenance. Loose-leaf type simulated leather binder.
- 6. Air Operated Collet Chuck. Said to be a new type of work-holding fixture, the Lynair collet chuck, Lynair, Inc., Jackson, Mich., is featured in a recent bulletin of the company. Collet is stationary when opening and closing; it is locked in place by means of a lock-ring in the bottom of the fixture. In the event of air pressure failure the workpiece is still held positively, and machining of the piece can be completed.
- 7. Cylinders. The A. K. Allen Co., 59 Meserole Ave., Brooklyn 22, N. Y., has a new leaflet describing its air, water, and L. P. hydraulic cylinders. Both double and single ended types. Screw machined high tensile aluminum heads on 2" and 3" cylinders. Ground and polished stainless steel rods.
- 8. Lubricant. "Friction Proofing," oil and water soluble, an additive for lubricants and coolant, is described, along with variaous applications such as turning, threading, drilling, forming, and general machining, in their latest booklet available from Wynn Oil Co., Dept. B, Azusa, Calif.

- 9. Super Finishing. Write Gisholt Machine Co., Dept. MB, 1245 E. Washington Ave., Madison 10, Wis., for their newest catalog describing the process, along with complete specifications on the 12 machines and 5 attachments available for this work, plus information and photographs on 28 different job applications. Ask for Form 1169.
- 10. Shop Tools. A very comprehensive catalog, No. 53-C, covering an extensive line of shop tools for machinists, has just been released by General Hardware Mfg. Co., Inc., Dept. B, New York 13, N.Y.
- 11. Grinders. A condensed catalog describing and illustrating the various products, such as suspended swing frame grinders, v-belt driven two speed for buffing and polishing smaller types, radial grinders, facing and boring heads, oilstone tool grinders, wire weaving looms, wire crimping wheels has been issued by Mummert-Dixon Co., 122 Philadelphia St., Hanover, Pa.
- 12. Vertical Milling Machine. The Duff Machine Co., Dept. B, 31 Wingate St., Haverhill, Mass., has recently published a bulletin covering its vertical milling machine with universal milling heads. Design of the head permits easy positioning of spindle at any angle. The overarm is set in a keyway to allow forward and backward adjustment without changing the accuracy.
- 13. Diamond Wheels. The latest catalog covering their full line of diamond wheels and hones, Catalog No. 2, is available from Diamond Productions, Inc., Dept. MB, Paterson, N.J.
- 14. Cutting and Grinding Procedures. The new 4-page brochure produced by Master Chemical Corp., Dept. BB, 13 Huron St., Toledo 1, Ohio, contains a pocket-size 44-page booklet on cutting and grinding procedures. Brochure and booklet contain charts and graphs showing recommended concentrations for machining different metals in all metalworking operations, as well as technical data for production and tool life increases.
- 15. Bending Machine. The "Big Brother" bending machine manufactured by J. A.

- Richards Co., 903-B N. Pitcher St., Kalamazoo, Mich., air operated at 100 lb. pressure, is well illustrated and described in the brochure recently released by the manufacturer.
- 16. Grinders, Sharpening Machines. The complete line of plain and universal precision tool sharpening machines and grinders manufactured by Haro, Robert Habib, Geneva, Switzerland, and distributed by American Haro Machinery Co., Inc., Dept. B, 37 Wall St., New York, N.Y., is completely described and illustrated along with various applications and setups in the most recent comprehensive booklet available from the company.
- 17. Metalworking Tools. A new condensed specifications folder describing drill presses of various types, cut-off machines, metal cutting band saws, abrasive disk and abrasive belt finishing machines, metal shapers, carbide tool grinders, welders, and toolmaker grinders has been released by Delta Power Tool Div., Rockwell Mfg. Co., Dept. B, 400 N. Lexington Ave., Pittsburgh 8, Pa.
- 18. Drilling. A new illustrated guide book with condensed, readable material on the best drilling practices, entitled, "Guide Book for Better Drilling," is available from Buffalo Forge Co., Dept. B, Buffalo, N.Y. Bulletin 3900 covers such material as drilling charts, tapping charts, tips on selection and application of drilling machines, definitions, types of points, failures of twist drills and their causes, feeds and speeds, cutting oils, do's and don'ts for operators, etc.
- 19. Centerless Grinder. Model TG-12 centerless grinder for thrufeed, plunge, or infeed grinding, is described and illustrated in the latest bulletin available from Royal Master Inc., Dept. BB, Riverdale, N.J. Detailed are: work wheel spindle, wheel dressers, hydraulic system, coolant unit, ram and ram bed, features of the machine.
- 20. Polygon Tool Box. The Chatwin polygon tool box for turning hexagonal, octagonal, square, or any irregular shapes within its capacity is described and fully illustrated in a comprehensive brochure recently released by Bradley Machinery Co., Dept. MB, 211 Jos. Campau, Detroit 7, Mich.

- 21. Drilling and Tapping Machine. Latest developments on a new variable speed drilling and tapping machine have been announced by the Edlund Machinery Co., Cortland 20, N.Y., in Bulletin No. 140. Featuring infinitely variable speed selection, Model 2F has power feed on the first two spindles, hand feed on the third, and a reversing motor tapper on the fourth.
- 22. Carbide Lubricants. The Metal Carbides Corp., Dept. BB, Youngstown, Ohio, announces the publication of a new technical bulletin, No. TB-2, entitled "Recommended Coolants and Lubricants for Talide Tungsten Carbide Cutting Tools and Drawing Dies." Included are coolants and cutting oils for machining all types of steels, ferrous and nonferrous metals, and non-metallic materials as well as lubricants for drawing all types of wire, bars and tubes.
- 23. Gages, Fixtures, Bushings. Micro-Lap precision gages, indicating and gaging fixtures, and Acro-Grip adapter bushings, made by H. C. Clatfelter Co., Dept. B, 21810 Wyoming Ave., Oak Park 37, Mich., are contained in recently published Catalog No. 54. Besides covering their products, it includes six full pages discussing gages and gaging practices.
- 24. Cemented Carbldes, Stainless Steel. A new edition of the Carmet methods manual on cemented carbides has just been issued by the Carmet division of Allegheny Ludlum Steel Corp., Dept. B, 2020 Oliver Building, Pittsburgh 32, Pa. It includes information on tool design, brazing, grinding, chip breakers, setups, coolants, cutting speeds, and reference data. Also available is the second edition of the booklet, "Allegheny Metal in Chemical Processing," covering the use of stainless steel in the manufacture of acids and other chemicals in the general process industries, plastics, pharmaceutical manufacture, dye and soap making. Included are corrosion resistance data, fabricating information, and a stainless steel finder.
- 25. Vertical Hydraulic Presses. Circulars 203, 205, and 206, released by American Broach & Machine Co., Div. of Sundstrand Machine Tool Co., Dept. BB, Ann Arbor, Mich., describe and illustrate, respectively, the V-1 2 ton press, V-1½ 4 ton press, and Type V-2 6 and 12 ton presses manufactured by the company.

- 26. Chucking Reamers. Superream drills and reamers, Twentieth Century Mfg. Co., Libertyville, Ill., are each available in standard size plus an undersize or oversize dimension to meet the demand precisely. All flutes are ground on face and back after heat treatment for smooth reaming. Information and price list in Bulletin No. 10.
- 27. Cutting and Grinding Fluid. The D. A. Stuart Oil Co., Ltd., 2727 S. Troy St., Chicago 23, Ill., is offering a cutting and grinding fluid selector for determining at a glance the correct fluid for machining any of 38 different materials. Also included is the Dulut-O-Graph, a repid calculator for oil dilutions. Full instructions are given for the operation of both. The company has also issued a 16-page book on grinding oils.
- 28. Screw Threads. A new 52-page book which is now ready for general distribution to responsible persons writing on company letterhead contains a wealth of screw thread information. Profusely illustrated in four colors. Greenfield Tap and Die Corp., Dept. B, Greenfield, Mass. Delivery in person or by mail should be specified.
- 29. Portable Band Saw. The new Porter-Cable portable band saw, Model 524, is shown in the newest brochure recently released by the Porter-Cable Machine Co., Dept. M, 1714 N. Salina St., Syracuse 8, N.Y.
- 30. Electronic Timer. The new Tele-Trol electronic timer, originally developed as a time delay shut-off for Benchmaster Koil Kradles, is now available for application to a wide variety of mechanical and electrical equipment, according to the latest brochure available from Benchmaster Mfg. Co., Dept. BB, 1835 W. Rosecrans Ave., Gardena, Calif.
- 31. Chuck Wrench. The Tappo chuck wrench, Gilbert Mfg. Co., Elkhart, Ind., quickly converts a drill press into an accurate tapping or reaming mechanism. Hand tap capacity—1/16-64 NS to 9/16-12 NC. Hand reamer capacity—½" dia. to ½" dia. Fits conventional 6A cap. 6-½" key-style chucks which measure 17/16" O.D. at keyhole body portion. Booklet available.

THIS HELPFUL LITERATURE NOW AVAILABLE

- 32. Bench Type Center-Mike. A complete, colorful bulletin describing the new Sorensen bench type center-mike is available upon request from Sorensen Center-Mikes, Inc., 264 Kossuth St., Bridgeport, Conn.
- 33. Gages. The Swedish Gage Co. of America, the C. E. Johansson Gage Co., 10641 Haggerty Ave., Dearborn 1, Mich., have issued two new booklets, one covering their adjustable bench gages, and the other describing and picturing their gage blocks and accessories, Extensometers, amplifiers, micrometers, surface finish indicators, dynamometers, snap gages, etc.
- 34. Chucks, Cutter Grinder. The recent brochure released by Clarkson Inc., Dept. B, 320 Ontario St., Toledo, Ohio, describes the Autolock chuck, Dedlock chuck, and the Clarkson cutter grinder.
- 35. Lubricant. "Magic" ball bearing lubricant made by Fiske Bros. Refining Co., Dept. BB, 129 Lockwood St., Newark 5, N.J., is described in a leaflet, F2-552, recently released by the company.
- 36. Press Guards. Power press guards and accessories are described and shown in various applications in Form No. 135, available from Searjeant Metal Products, Inc., Dept. HB, Mendon, N.Y.
- 37. Drilling Coolant Table. A precision drilling coolant table for all drill presses with a self-contained coolant system for mounting on any drill press is described and shown in a comprehensive booklet available from Commander Mfg. Co., Dept. BB, 4225 W. Kinzie St., Chicago 24, Ill.
- 38. Cast Iron Dust Control. Collecting cast iron dust, a type of dust commonly considered difficult to control, with a standard Dustkop dust collector is illustrated and described in Bulletin 640 No. 1, issued by Aget-Detroit Co., 205 Main St., Ann Arbor, Mich. Bulletin briefly analyzes the problem, relates the steps taken in selecting and installing the equipment, gives the cost of the installation.
- 39. Automatic Turret Lathe. The new Model 4-U automatic turret lathe, claiming greater productivity, extra power, high precision, is fully described and illustrated in the latest bulletin available

- from Potter & Johnston Co., Dept. B, Pawtucket, R.I.
- 40. Tool Steel. A very comprehensive loose-leaf catalog covering the complete line of tool steel available from Henry Disston & Sons, Inc., Dept. B, Philadelphia 35, Pa., is available from the company.
- 41. Milling Machine. A new bulletin describing the Elgin precision horizontal bench milling machine has recently been released by Elgin Tool Wks., Inc., Dept. MB, 1770 Berteau Ave., Chicago 13, Ill.
- 42. Band Saws. W. O. Barnes Co., Inc., Dept. BB, 1237 Terminal Ave., Detroit 14, Mich., has available a folder that describes their full line of band saws and shows the applications for the various types, such as raker, wavy, and skip tooth sets.
- 43. Filters, Water, Oils. Synclinal filters, for hydraulic oils, coolants, and lubricants, are described and illustrated in Catalog 106 and Synclinal filters for water, in Catalog 300, recently published by Marvel Eng. Co., Dept. BB, 625 W. Jackson Blvd., Chicago 6, Ill.
- 44. Die Casting Machines. A new bulletin just released by the Cleveland Automatic Machine Co., Dept. B, Cincinnati 12, Ohio, describes the Model 50 and Model 100 Cleveland die casting machines, hydraulic, the two smallest machines in the Cleveland line, Model 50 is for aluminum, brass, or magnesium alloys, while Model 100 is for zinc, tin, or lead.
- 45. Fasteners. A new 36-page catalog, "Better Fastening for Better Products," showing the complete Mac-it line of alloy steel screws, along with dimension standards, charts for standard sizes and list prices, and all specifications on the various point styles of hollow set screws in one chart. Write Mac-it Parts Co., Dept. B, Lancaster, Pa.
- 46. Industry Location Spot. "Ligonier, Ind., a Choice Location for Industries of Tomorrow," is the title of an ingenious 10-page booklet, 11x8, pointing out the desirable features of this town as a future location for industry. Choice industrial land, free of any cost, is offered. Ligonier is within 150 miles of the major midwestern population centers. Write Chamber of Commerce, Dept. BB.

SENT FREE UPON RETURN OF POSTAL CARD

- 47. Arbors. Literature covering their complete line of arbors and adapters in 30, 40, 50, tapers as well as 7, 9, 10, and 11 B & S tapers, (181 sizes and styles of milling machine arbors, shell and mill arbors, end mill adapters, shell reamer arbors, collet adapters, chuck adapters, fly cutter arbors, arbor spacers, end shims and running bushings) is obtainable from Grand Tool & Supply Co., Dept. B, 176 Grand St., New York, N.Y.
- 48. Jig borer parts list. Parts list No. 1 recently released by Linley Bros. Co., Dept. B, 682 State St. Extension, Bridgeport 1, Conn., contains almost 600 parts and accessories for their jig boring machine. They are grouped under six major groups: Major parts, drive group, sliding head group, power feed group, compound table group and miscellaneous parts.
- 49. Bore square holes. Four page bulletin offered by Bansbach Machinery Co., Dept. B, 221 N. Cicero Ave., Chicago, Ill., describes a new method of boring polynominal profiles, male or female, in steel. Booklet also explains the use of Nylon Templates for special shapes other than square and hexagon.
- 50. Boring Tool, Taper. Tree Tool and Die Wks., States Trading Co., Dept. MB, 401 Broadway, New York 13, has illustrated brochures with various applications showing their taper boring tool

- and back taper boring attachment and Tree boring heads with descriptions and illustrations. The milling attachment, Inner-Mil, and milling table are described in literature available from Tree Tool and Die Works, 1600 Junction Ave., Racine, Wis.
- 51. Milling Machines. Austin Industrial Corp., 76-G North Mamaroneck Ave., White Plains, N.Y., have prepared colorful brochures covering their complete line of Sajo milling machines, plain or universal types.
- 52. Presses, Power, Punching Tools and Dies, Fabricating Tools. The Cleveland Punch and Shear Wks. Co., Dept. BB, Cleveland 14, Ohio, have prepared illustrated literature describing their complete line of punching tools and dies, fabricating tools, and power presses.
- 53. Demagnetizers. Regular and electromatic AC demagnetizers manufactured by Electro-Matic Products, Inc., Dept. B, 2235-37 N. Knox Ave., Chicago, Ill., are fully described in an illustrated catalog available from the company.
- 54. Surface, Universal. Crystal Lake Grinders, Dept. MB, Crystal Lake, Ill., have issued literature on their Model 612 surface grinder, available on either double taper or ball bearing design spindles, and their 1018 universal grinder.

FIRST CLASS
PERMIT NO. 272
SEC. 34.9, P. L. & R.
WHEATON, ILLINOIS

BUSINESS REPLY CARD

NO POSTAGE NECESSARY IF MAILED IN THE U.S.A.

3c POSTAGE WILL BE PAID BY

MACHINE and TOOL BLUE BOOK
READERS' SERVICE DIVISION
WHEATON, ILLINOIS

- Marking Equipment. The line of safety web letters and figures manufactured by
 E. Cunningham Co., Dept. BB, 1048
 Chateau St., Pittsburgh, Pa., is included in their illustrated catalog, No. 100.
- 56. Milling Machine. No. 10-RH universal ram, turret type, vertical, horizontal milling machines made by Fray Machine Tool Co., Dept. B, 515 W. Windsor Rd., Glendafe, Calif., is shown in Bulletin 10. The Fray all-angle head type for deep, heavy cuts is described in Bulletin 4.
- 57. Broaches, Kits. The du Mont Corp., Dept. B, Greenfield, Mass. will send descriptive material covering their special broaches for keyway broaching and kits, magnetic base dial indicators and super high speed ground tool bits engraver, die sinking machine.
- 53. Die-Sets, Supplies. Danly die-sets and Danly die-maker supplies are fully explained and illustrated in brochures available from Danly Machine Specialties Inc., Dept. BB, 2100 S. Laramie Ave., Chicago 50, Ill.
- 59. Milling Machine. O.B.I. punch presses, horn presses, power squaring shears, punch presses, turret, and multi-max punch presses are covered in illustrated literature and technical data available

- from Diamond Machine Tool Co., Dept. MB, Pico, Calif.
- 60. Honing. Honing machines, honing tools, honing fixtures, centrifugal casting machines, etc., manufactured by Allen Fulmer Co., Dept. MB, 1242 First National Bank Bidg., Cincinnati 2, Ohio, are covered in illustrative and descriptive folders obtainable from the company.
- 61. Tungsten Carbide Metals and Tools for work support blades, lathe and grinder centers and diamond dressers are included in Price List Catalog WRB-310, Willey's Carbide Tool Co., Dept. MTB, 1342 W. Vernor Hwy., Detroit 1, Mich. Price List MT-539 contains information on tungsten carbide metals and tools for standard tools, roller turning tools, boring tools, standard blanks, special blanks, solid inserts.
- 62. Grinding Machines. Catalog of the Standard Electrical Tool Co., Dept. B 2486 River Rd., Cincinnati 4, Ohio, distinguishes Standard's diversified engineering-manufacturing facilities—pneumatic, hydraulic, mechanical, electrical, electronic. From single purpose attachments to multiple purpose high production automatic machinery—each developed for a specific requirement. Request Catalog AG.

Tear Off and Mail This Postage-Paid Postal Card

| M | ACH | IIN | E a | nd | TO | OL | BL | UE | BO | OK | | 1 | MA | Υ, | 19 | 5 4 |
|------|------------|-------|-------|--------|--------|--------|------|-------|---------|-------|--------|--------|---------|--------|---------|-----|
| Plea | 90 96 | end t | he li | terati | ire w | hich | I ha | ve a | ncircle | ed be | low: | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
| 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 |
| 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 |
| 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 |
| 69 | 70 | 71 | 72 | 73 | | | | | | | | | | | | |
| | | | | | | | | | | | | | ******* | | | |
| STR | EET. | | | ****** | ****** | ****** | | ••••• | | | ****** | ****** | ****** | ****** | ******* | |
| ~ | ~ | | | | | | | | | | | _ | | | | |

ENGRAVE

NAME PLATES - PANELS - DIALS



10,000 IN USE Accepted by all leading manufacturers as the speediest, most versatile portable engraver. Only the NEW HERMES has these patented features:

- Adjustable for 15 ratios.
- · Self-centering holding vise.
- Automatic depth regulator.
 Adjustable copy holders.

Send for Catalog No. IM-28, describing full line of Engraving Machines including HEAVY DUTY BENCH TYPE MODEL (200 lbs.)

NEW HERMES ENGRAVING MACHINE CORP.

13-19 University Pl., New York 3, N.Y.

63. Vertical Milling Machine. Improvements and features of the U. S. Vertical milling machine, the U.S.-Burke Machine Tool Div., Dept. BB, Brotherton Rd., Cincinnati 27, Ohio, are claimed to be balanced rigidity, simplified belt changing, conveniently mounted switch, tool storage compartment. New brochure describes and illustrates machine.

64. Power Brushes, The Heli-Master U is a hard-working brush of one-piece con-

struction, designed for fast, easy removal and mounting on arbors. Manufacturer is the Osborn Mfg. Co., 5401-4 Hamilton Ave., Cleveland 14, Ohio. Heli-Master FA is built for speeds up to 10,000 sfm. It provides density of fill to a 180" brush face length for cleaning, scrubbing, finishing, rust and scale removal. Heli-Master CA is a helically wound Master strip, for the customer who wants to assemble his own brush. Bulletin C-269 describes all three.



65. Portable Elevating Table, Small Hole Drilling Machine. Bulletin P-54 presents the features and specifications, and many of the applications, of Portelvator, the portable elevating table made by the portable elevating table made by the Hamilton Tool Co., Dept. B, 9th St. at Hanover, Hamilton, Ohio. Bulletin AM-54 describes the super sensitive small hole drilling machine suited for production drilling of precision holes in small workpieces.

66. Gear Grinders. Eight-page illustrated catalog on geargrind machines is an-nounced by the Gear Grinding Machine Co., Dept. BB, 3901 Christopher, Detroit 11, Mich. It provides information on the entire line of machines as well as types and specifications of gears, splines, and special-contoured parts that can be ground on them.

67. Safety Vise. The Peters' Mfg. Co., Dept. B, Oakland 7, Calif., has issued a booklet covering its Dril-Lox safety vise, which is said to bridle torque action. Rotary action of drill locks work and vise to the table. The greater the torque, the mightier the grip.



Grips with 15 times air line or compressor pressure! All operating parts protected from oil, dirt, chips, etc. Saves tooling costs; use it as base structure.



New Catalog Free!

Be sure you have a complete Heinrich Tool Catalog in your files. Your copy will be sent free upon request.

Dept. 104-E Drill Press Vises . Fixture Locks . Punches . Rod Cutters

68. Grinding Wheel Dressers. Leaflet describing the various models of grinding wheel dressers manufactured by L. Newman, Dept. MB, 1001 24th St., Oakland 7, Calif., is now available. Includes models designed for the surface grinder with or without a magnetic chuck, for dressing and truing grinding wheels on cylindrical grinders; hand type dressers; heavy duty; universal.

69. Small Businesses. Help for small business is contained in Bulletins Nos. 31, 41, covering radioisotopes and small business, and how the U.S. employment service

helps small businesses, respectively. Booklets just released by Small Business Administration, Washington 25, D.C. "Cost accounting for small manufacturers" by R. Lee Brummet, School of Business Administration, University of Michigan, also has recently been made available. The cost is 35 cents.

70. Precision Lapping Service. The Crane Packing Co., Dept. MBW, 1800 Cuyler Ave., Chicago 13, Ill., has issued an illustrated booklet, No. L-407, to describe its precision lapping service. Modern high speed methods are utilized to gain close





GANG CUT . . . BAR STOCK

On the toughest metal cutting jobs, Atlantic Wavy Set Bands always deliver faster, more accurate "gravity fed" machine cutting — bite through hardened steel in seconds flat — leave score-free, finished surfaces. Here's the secret behind this vastly superior performance: Atlantic special design band with a wave of teeth to the left, then to the right, sweeps away chips as it cuts — provides cool, free operation throughout prolonged blade life.

FREEI

Send today for the graphic story of Atlantic's family of fine saws.





Brewery Street New Haven, Conn.





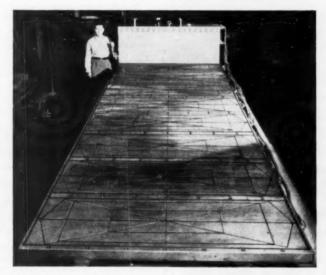
EVEN I BEAMS
TO THE DESIRED LENGTHS
ON THE SAME MACHINE
IN LESS TIME!

tolerance while holding costs at a competitive level. All work is subjected to rigid inspection.

71. Taps. A fully illustrated 20-page catalog and price list just published by Reiff & Nestor Co., Dept. BB, Lykens, Pa., provides complete data regarding size, threads, flutes and prices for standard taps, as well as special taps made by the company.

72. Grinding Fixture. Harig Mfg. Corp., Dept. BB, 5451 W. Howard St., Chicago 31, Ill., has just released a brochure illustrating and describing the features of their new Harig grind-all fixture, for precision grinding of perforators, carbide grinding, inspection, light milling, radius dressing, and many other adaptations.

73. Magnetic Separators. Complete information on the construction and uses of magnetic separators for fast handling of steel plates and sheets is included in the new 4-page catalog recently published by Basco Mfg. Co., Dept. MB, Stamford, Conn.



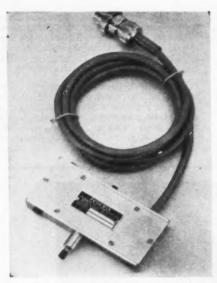
WALKER, pioneer in the chuck industry, has been utilizing magnetic force to make all types of special and standard chucks since 1887.

WALKER now harnesses atmospheric force for special vacuum chucks to hold non-magnetic materials. Pioneer in magnetic force—now pioneer in atmospheric force.

O. S. WALKER CO.Inc.

WORCESTER 6, MASSACHUSETTS

Original Designers and Builders of Magnetic Chucks



dial indicator placed at the upper end of the spindle.

The unit can be used for sorting to sizes with over and undersize tolerance



BANSBACH 221 N. CICERO AVE. MCHY. CO. CHICAGO 44, ILL. lights, or it can be employed on highspeed, completely automatic electronic gages to measure eccentricity, squareness, run-out, straightness and wobble.

Any number of Eccentricators can be mounted side-by-side either horizontally or vertically for multiple dimension gaging at close quarters. The instrument has satin chrome finish and weighs 14 ozs. Dimensions ½" thick x 3%" wide x 1¾" high.

Use ACTION Card, eppesite page 64. Encircle No. 77

Air-electronic gage measures i.d., stamps size of refrigerator cylinder blocks

A new gage, which combines air with electronics to measure the i.d. of refrigerator cylinder block bores and stamp them with a code indicating the size, is announced by Federal Products Corp., 2512 Eddy St., Providence, R.I.

The cylinder blocks are stamped (coded) into 16 categories, each equal to .0001",



plus oversize and undersize. The speed depends upon the operator, who manually sorts the workpieces according to classifier lights or the markings stamped. Use ACTION Card, opposite page 64. Encircle No. 165

Compass-measuring device

A new beam compass and measuring device, used for making any radius up to 1500 millimeters or about 60", or circles up to 120" dia., is being manufactured by A. E. Fristedt, Dept. B, Stockholm-Bromma, Sweden.

The device consists of a drum of plastic material with flat bottom; the drum contains a metal measuring tape of four different scales: millimeters and inches on the upper face and two pattern makers' shrink scales on the back side.

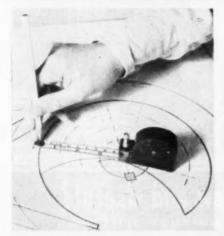
Tape can be fixed in any length by a locking screw; pencil, pen or metal point may be used for drawing or scribing. Under the screw is a regular interchange-

SET-UPS

You can save valuable production time by using the MASTER MULTI-SWIVEL VISE. Fully universal . . . easily operated. For intricate, angular setups. THREE swivels instantly set any compound angle required. Used in shops throughout the world! Interchangeable platen optional. Send for free informative circular. Write today.

DONOVAN MFG. CO.





able draftsman's tack which is pressed down in the center from which the radius is measured. The compass may be carried and used the same as an ordinary measuring tape.

Use ACTION Card, opposite page 64. Encircle No. 78

MICRO-HEIGHT GAUGE

BY FAIRFIELD GAUGE CO.



NO OTHER GAUGE COMPARES FOR FAST, ACCURATE LAYOUT AND MEASURING

Capacities to 6" when used with this Fairfield Gauge 3" Riser

The Micro-Height Gauge is a precision instrument, finished in satin chrome, which reads like a micrometer and measures from zero at base to 3" in thousandths. Use as a scriber for fast layout, or insert dial indicator for quick, accurate inspection.

Exclusive distributor for U.S. and Canada:

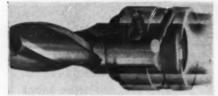
CLEVELAND INSTRUMENT CO.

735 Carnegie Ave., Cleveland, O.



New type end mill and holder

A new type of end mill and holder which, the manufacturer claims, reduce tool costs as much as 25% are announced by Putnam Tool Co., Dept. MB, 2981 Charlevoix Ave., Detroit 7, Mich. This design, called Postiv-Lok, is said to eliminate the need for integral tapered shank end mills on large boring mill jobs, profiling, duplicating, and similar heavy

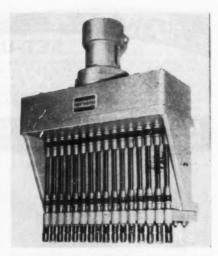


duty applications. They are available from stock in sizes ranging upward from 1½" diameter. These are used with a Postiv-Lok end mill holder, also made by Putnam.

Use ACTION Card, opposite page 64. Encircle No. 79

Special universal joint drillhead

A new Thriftmaster 16-spindle, straightin-line drive, adjustable drillhead has



been announced by Thriftmaster Products Corp., 1004 N. Plum St., Lancaster, Pa. This drillhead provides multiple drilling of a series of models of trowel handles having in-line holes with centers varying



DON'T SCRAPE DON'T SCRAP

worn surface plates them either

Step-them-down and continue using them for less accurate work.

You'll save enough money to replace with Rahn Diabase for your most accurate work.

It's being done. Many companies have adopted this NO COST way of converting from metal to Rahn Diabase (black granite) Surface Plates.

PROVE IT YOURSELF... FREE 30 DAY TRIAL WRITE FOR BOOKLET ON DETAILS.

THE COMPLETE LINE Surface Plates • Angle Plates ¶ Straight Edges • Parallels



RAHN GRANITE SURFACE PLATE CO.

639 N. Western Ave., Dayton 7, Ohio

WESP0

T-BOLTS

BOLSTER & T-SLOT

to J. I. C. press room standards

Forged, precision machined heat treated. Tensile strength 150,000 lbs.

SIZES

BOLSTER BOLTS — dia. to 1½"
Heads sq. to 3" hex. to 2½"
T-Slot botts, ½", ¾", ¾" dia.
lengths to 12". 1" dia. 4" to 22"

NUTS — hardened — threaded to close fit. WASHERS — hardened — ground both sides.

Write for bulletin-prices
WEST POINT MFG. CO.
26931 W. 7 MHz Road

Detroit 19, Mich.

The STEVENS Line

SINCE 1925

Showing 7½" Dial Type Rotary Table mounted on compound table No. 1

- Traverse and Circular Movements -



Made in larger size 12" dial type Rotary compound table No. 2. Either unit usable separately. Five sizes of Rotary Tables. Adjustable tilting tables. Multiple spindle index centers. Screw head slotters. Vises.

Write for Bulletins

The JOHN B. STEVENS Company
SOMERSVILLE, CONN.

PORTABLE ELEVATING TABLE



Saves TIME and

Eliminate heavy lifting and cut handling costs. Slight foot pressure varies height up to 15½", leaving operator's hands free. Table swivels and locks in any position.

SEND TODAY FOR ILLUSTRATED CATALOG NO. 2

MIDWEST TOOL & ENG. CO. 112 WEBSTER ST., DAYTON, OHIO



AIR-WAY PUMP & EQUIPMENT CO. 1054 N. Kilbourn Ave. Chicago \$1, III.

PYRO Radiation Pyrometer



Pyrometer
Determines spet
temperatures of heattreating furnaces, fire
boxes, kilns and
forgings accurately—
instantly, No thermocouples, lead wires or
accessories needed.
Tomperature is recorded on directreading dial at press
of button. Two double
ranges. Write for
FREE Cat. No. 100.

The PYROMETER INSTRUMENT Co. New Plant and Lab., Berganfield 3, N. J.



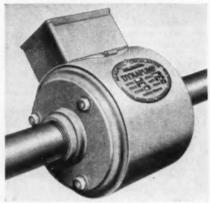
from model to model. The head, with a spindle range of adjustment within a 1½" radius of their respective driving points, has a ½" drilling capacity in cast iron.

Use ACTION Card, opposite page 64, Encircle No. 80

Magnetic pump for circulator applications

A new type of magnetic pump for circulator applications has been announced by The Fostoria Pressed Steel Corp., Dept. MTB, Fostoria, Ohio.

Known as the Dynapump, this new circulator is said to be exceptionally quiet and has no shaft seal or motor bearings to require service. Compact and light in weight, the unit gives unusually high heads of 24' making it particularly adaptable for radiant and baseboard heating



jobs. Since all pump parts are of corrosion-eliminating stainless steel, it is suitable for either fresh or closed water systems. The one standard unit accepts interchangeable flanges from ¾" to 1½" and carries a two-year warranty.

Use ACTION Card, opposite page 64, Encircle No. 81

Tool and work cart

Tool and work carts made by Bay Products Inc., 3003 N. 16th St., Philadelphia 32, Pa., are now available in heights of 34". Shelves are made of 14 gage steel with a 2" flange, legs of 14" x 14" x 14" angle iron. Each shelf is attached to legs by 16 bolts and lock nuts, giving exceptional rigidity to the assembly. All shelves are reversible. Carts are furnished with four 24" swivel casters,

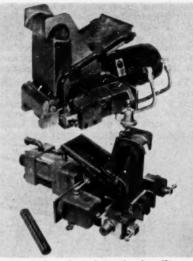


either rubber or steel. Finished in baked Use ACTION Card, opposite page 64. Enefrele No. 82

New line of automatic loaders for

single ram broaching machines

A new line of Red Ring automatic loaders for single ram vertical surface broaching machines is announced by National Broach & Machine Co., 5600 St. Jean, Detroit 13, Mich. These loaders are



particularly adapted to the handling of round parts on which flats, slots or ends are broached in single ram machines. The loaders have magazine feed ar-

ommander TAPPER Wider Range . . . 1 Tapper Handles No. 0 to 3/4" Taps **Automatic Tap Protection** • Furnished to fit ANY Drill Press Commander—"The Tapper That Thinks For Its Operator," has the adjustable full range torque control that instantly stops any tap when it becomes dull, loaded, strikes a hard spot or bottoms in blind hole tapping. Assures maximum tap protection, higher production, even with inexperienced Any operator operators. your nearby Commander Distributor can give you a demonstration in your own plant. Write for his name and a copy of the NEW Commander Full Line Catalog No. 851 does precision tapping with COMMANDER MFG. CO. a Commander 4227 W. KINZIE STREET CHICAGO 24, ILL. TAPPER Product of Commander . . . Builder of Production Tools Product of Commander ... Builder of the Multi-Drill rangements that work in conjunction with a hydraulic cylinder powered load and unload mechanism. The 1,000 psi hydraulic control cylinder is flange mounted at the rear of the loaders and is operated by an air booster. A standard air line source will operate the boosters.

The loader at the bottom of the accompanying illustration positions two %" dia., 6" long automotive automatic transmission control rods in front of a broach on a single ram vertical machine where

two slots and one end are finished by the broaching process.

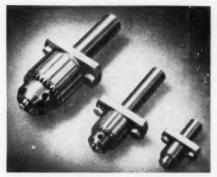
Use ACTION Card, opposite page 64. Encircle No. 83

Chuck-type floating holder

Alignment of drills, reamers, counter bores and similar tools is said to be quickly accomplished with Barnaby by chuck-type floating holders, made by Barnaby Mfg. Co., 74 Knowlton St., Bridgeport, Conn.

Barnaby holders are made in two parts, the shank, which has an integral flange,





and a similar flange on which the chuck is mounted. The two parts are fastened together by two cap screws, threaded into the shank flange. Screw holes in the chuck flange are larger in diameter than the screws, permitting the chuck-held cutting tool to be brought into perfect alignment with the work. Finished by the Du-Lite process to assure rust-resistance and provide longer active life, the process rounds off the microscopic spines and edges which are present even on highly

polished bearing surfaces and, with its inherent oil absorptive properties, greatly reduces friction and prevents galling and scoring; finish will not chip, peel, crack Use ACTION Card, opposite page 64. Eneirste No. 84

Tap and drill breakage eliminated with pressure gage

The application of the Dillon pressure gage as a means of cutting production costs caused by the breakage of drills





and taps in drill press work, is especially useful where quantity repetitive work is being done, and where the smaller sizes of taps and drills are used. The gage is made by W. C. Dillon & Co., Inc., 14620 Keswick St., Box 3008, Van Nuys, Calif.

The regular drill handle is removed and a split handle inserted, with the pressure gage as part of the handle. Pressure is measured in pounds.

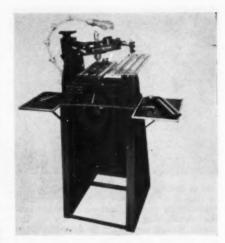
In the event the drill press is needed for other operations not requiring the gage, the split handle can quickly be removed and the regular one replaced. Gages are available in nine capacities from 0-10 lbs., to 0-5,000 lbs.

Use ACTION Card, opposite page 64. Encircle No. 85

Floor stand engraving machine

A new floor type of engraving machine has resulted from adding a fabricated floor stand, a new hand wheel screw work table adjustment and other features to the Model UE-3 Preis-Panto engraving machine.

Designated as the Model UE-3E, the height of the stand is 30" and the width is 19" x 19" deep. The complete assembly



including the engraving machine is $47\frac{1}{2}$ " high x 23" left to right without the shelves; net weight 170 lbs. H. P. Preis Engraving Machine Co., 163 Industrial Branch, Hillside, N.J.

Use ACTION Card, opposite page 64. Encircle No. 86



STEEL HAND and POWER

BENDING BRAKES

for Single and Quantity Runs

BENDING STEEL PLATE and SHEET METAL

Special Bending Brakes Double Folder Brakes





Air-operated end-finishing machine speeds handling of deburring, chamfering, and facing operations

The Series 700 air-operated endfinishing machine, designed for large work up to 3" O.D., is for deburring, chamfering and facing operations. The model has a 2" stroke and a maximum spindle speed of 2000 r.p.m. for fast operation. It is made by Pines Engineering Co., Dept. B, 601 Walnut St., Aurora, III.

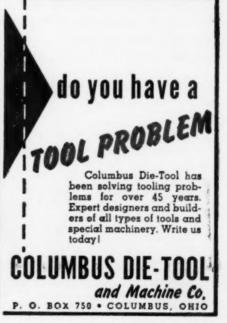
Chuck and spindle air cylinders are controlled through a convenient, electric foot switch. The movement of the foot switch closes the chuck, the work-locating stop is pivoted clear by a small air cylinder mounted on the side of the clamping unit, and the spindle is advanced through the machining cycle. The spindle advance unit is a Bellows air cylinder with a hydrocheck which controls the feed rate of the tools. An adjustable stop automatically retracts the spindle when the cut is completed. Both the chuck and spindle advance cylinders operate from the same air line at 70-80 pounds pressure. Cycle time of the unit,



less cutting time, is 1.5 seconds.

The unit has a wide range of applications for such operations as light turning with hollow mill tools, chamfering





CONTINUOUS HINGES FOR ALL YOUR REQUIREMENTS

Wherever continuous hinges and metal corners are needed, you'll find the answer at . a reliable source of supply with the finest facilities to meet your requirements. Hinges furnished in brass, aluminum, stainless and steel.

Send Us Your PROBLEMS



ALSO METAL STAMPINGS OF ALL TYPES



REX METAL PARTS CO. 1297/ WEST 78th STREET ///CLEVELAND 2, OHIO

and pointing bar stock, shaping tube or rod ends, or center-drilling. Tools and chuck jaw inserts are interchangeable to fit required work diameters within the maximum 3" diameter range. The spindle drive motor, with variable-speed con-trol for work diameters, is enclosed within the machine base.

A compact, floor-mounted model, it has a base 20" wide x 39" long, with a 6" chuck overhang on the width and a 18" overhang of the spindle unit to the rear. The total over-all floor space requirement is 26" wide x 57" long x 45%" high. Weight of the unit, complete with airoperated cylinder, is 850 pounds.

Use ACTION Card, opposite page 64. Encircle No. 37

speed can be read on a conveniently located speed indicator. Sliding gears and spline shafts are ground and run



in an oil bath in the totally enclosed gear box. Power feed to the table operates in both directions at rates from .01" to .04" per stroke. Power downfeed

22" precision V-ram shaper available with plain or universal table

The No. 22 Wotan precision V-ram shapers manufactured by Parker Machine Co., Dept. B, 158 Pioneer St., Brook-lyn 31, N.Y., claim ease of operation, accuracy and versatility for toolroom and production work. Powered by a 5 hp motor, 8 ram speeds between 12 and 132 strokes per minute are obtained by the shifting of two levers. The engaged

CE DRILL B

. . . with full length bearing precision bushings, O.D. ground true to I.D. . We specialize in hole sizes #80 to %", in any body size. Other sizes to your specifications. Production small hole drilling, our specialty.

Write for catalog and quotations.



to the tool slide and automatic tool lifter

are available.

Both the plain table and the universal table are supported at the front end in all positions. A tilting top plate can be had for either type of table. Length of ram stroke as well as position of stroke can be changed while the shaper is in operation.

Use ACTION Card, opposite page 64. Encircle No. 88

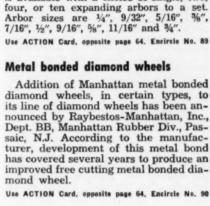
Bushing extractor for small holes

A new improved bushing and bearing extractor, believed the only unit available for extremely small size holes, has been recently perfected by the Crozier Machine Tool Co., Dept. MB, 684 North Prairie Ave., Hawthorne, Calif.

The new unit, a smaller companion to the larger Crozier bushing extractor set, consists of ten threaded expanding arbors, a draw table, and can handle the extraction from any hole from \(^{1}4''\) to \(^{2}5/32''\)

diameter i.d.





Although it can be used in universal applications, it was primarily designed at the request of aircraft, automotive

and electronic production men, to provide

a quick, easy method of removing bushings, bearings, sleeves, liners and similar

units without shock or damage to the

delicate equipment from which they must

The series 100, as it has been designated, is available with a choice of single, two.

be separated.

Tool holder absorbs shock, vibrations

The American Tooling Corp., Dept. MB, 60 E. 42 St., New York, N. Y., announces a new tool holder which absorbs vibrations and shocks occurring when turning rough surfaces or other than round work. In addition to absorbing shocks, the tool holder maintains a constant cutting angle, it is claimed.

To be known as the "Recoiler," the new



Puts actual load of 3000 KG on 10 mm. ball. Test head removable for testing very large parts.

ANDREW KING

Ardmore, Pa.





ENNAMETAL Suc LATROBE, PA.
CEMENTED CARBIDE TOOLS,
BLANKS, MILLING CUTTERS

tool holder prevents breakage of bits, prolongs cutting tool life, and permits higher machine tool speeds.

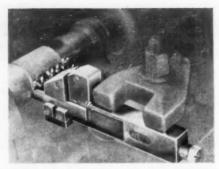
Due to the shock absorbing action of the Recoiler, carbide bits can be used in applications which would break these same bits if held in a rigid tool holder.

The head of the Recoiler is connected to the body by a specially designed linkage which holds the cutting tool at a constant angle.

All shocks and vibrations are transmitted to a rubber spring pack located inside the shaft of the tool holder. The spring pack's ability to absorb vibration and shocks can be regulated by adjusting a stop-bolt at the end of the shaft of the Recoiler.

The same Recoiler can be used for left or right hand operations and for cutting, parting, and threading.

The head of the holder is linked to the body in such a way that head, body and linkages form a parallelogram with pivots at each corner. The body, which is held rigid in the machine-tool poster, forms one side of the parallelogram. The head, to which the cutting tool is secured, forms the opposite side. Two parallel linkages form the other two sides. Because of the



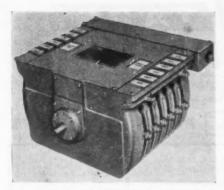
nature of the parallelogram, the cutting tool can move only parallel to the body of the tool holder, and the cutting angle remains constant.

Use ACTION Card, opposite page 64, Encircle No. 91

Rotary cam limit switch adjustable during operation for quick timing

Developed to meet the specific needs of mechanical press automation devices, a new rotary cam limit switch has been announced by Danly Machine Specialties,





Inc., Dept. M, 2100 S. Laramie Ave., Chicago 50, Ill.

The Danly switch features external adjustment during operation of the press. This provision simplifies the synchronizing to the press cycle of independently powered press auxiliaries since the press can be stroked while individual switches are being adjusted. Fine adjustment of each switch is simply made by setting a thumbscrew on the outside of the housing. The large diameter swept by the

cam faces offers an added factor of adjustment sensitivity. At the point of adjustment of the thumbscrew, one degree is equivalent to about 1/6" of adjustment.

Use ACTION Card, opposite page 64. Encircle No. 92

Metallograph improved

William J. Hacker & Co., Inc., Dept. B, 82 Beaver Street, New York 5, N.Y., announces that components enabling the most upto-date methods for examing metallic surfaces have been incorporated in the newly designed Reichert Metallograph. The following features



following features have been added: phase contrast for metallurgy; interference tester for surface finish; micro hardness tester; zirconium arc illumination; vibration isolator; desk with built-in controls.

Use ACTION Card, opposite page 64, Encircle No. 93

G&F "Sharp-Grind" will save you money



Cut your tool grinding costs by sharpening tools right in your own plant with this time and money saving attachment. Fits most surface grinders with movable bed and the

simple adjusting screw makes it easy to sharpen tapered, spiral and straight reamers, milling cutters and end mills.

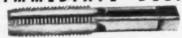
____Mail Today For Specifications and Prices ____

NAME......ADDRESS.....

..STATE

GRINDERS & FIXTURES, INC. 8327 Clinton Rd., Cleveland 9, Ohio

Special TAP IMMEDIATE



HIGH SPEED SPECIAL

RIGHT HAND TAPS

| SIZE | THREAD | SIZE | THREAD | SIZE | THREAD |
|-------|----------------------|---------|---------------------------------|-----------------|----------------|
| 4 | 32-48-60-64 | 3/8 | 12-16-18-20-27-28-32-36-40-48 | 1-3/4 | 8-10-12-14- |
| 5 | 30-32-36-48-80 | 7/16 | 12-16-18-22-24-27-28-30-32-36- | | 16-18-20-24 |
| 6 | 36-40-48-56-60 | 2710 | 40 | 1-13/16 | 8-10-12-14- |
| 7 | 32-40-48 | 1/2 | 12-14-16-18-22-24-26-27-28-30- | | 16-18-20 |
| 8 | 24-30-36-38- | 1/10 | 32-36-40 | 1-7/8 | 8-10-12-14- |
| - | 40-44-48 | 9/16 | 16-20-24-27-28-30-32-40-48 | 1-15/16 | 16-18-20-24 |
| 9 | 24-28-32-40-48 | 5/8 | 12-14-16-20-24-27-28-32-36-40 | 1-13/10 | 16-18-20-24-28 |
| 10 | 28-30-36-40- | 11/16 | 11-16-18-20-24-27-28-39-32 | 2 | 41/2-8-10- |
| | 48-64 | | 9-11-12-14-18-20-24-26-27-28-32 | | 12-16-18-20 |
| 12 | 20-28-32-36-48 | 3/4 | | 2-1/16 | 12-14 |
| 14 | 20-24-28 | 13/16 | 10-14-16-20-27-32 | 2-1/8 | 12-16-20 |
| 1/16 | 60-64 | 7/8 | 10-12-16-18-20-24-27-28-32 | 2-3/16 | 12-16 |
| 5/64 | 36-48-72 | 15/16 | 8-9-10-12-14-16-18-20-24-32 | 2-1/4 | 41/2-8-12- |
| 3/32 | 48-56-60 | | 10-12-16-18-20-24-27-32-40 | | 14-16-18 |
| 7/64 | 48-56-60 | 1-1/16 | 12-14-16-18-20-24 | 2-5/16 | 12-18 |
| 1/8 | 32-40 | 1-1/8 | 8-10-14-16-18-20-24-32 | 2-3/8 | 12-16-18 |
| 5/32 | 32-36-40-48 | 1-3/16 | 8-10-12-14-16-18-20-24 | 2-1/2 | 8-10-12 |
| 9/64 | 36-40-48 | 1-1/4 | 8-10-14-16-18-20-24-32 | 2-9/16 2-5/8 | 12-16-20 |
| 11/64 | 36 20-24-32 | 1-5/16 | 12-14-16-18-20-24-32 | 2-3/6 | 16 |
| 3/16 | | 1-3/8 | 8-10-14-16-18-20-24 | 2-7/8 | 8-12-16 |
| 13/64 | 32-36-48 24-28-32 | 1-7/16 | 8-10-12-16-18-20-24 | 3.1/0 | 8-16 |
| 7/32 | 18-24-26-27- | 1-1/2 | 8-10-14-16-18-20-24-28 | 3-1/4 | 8-12-16 |
| 1/4 | 30-32-36-40-48 | 1-9/16 | 18-20-24-36 | 3-1/2 | 8-12-16 |
| 5/16 | 16-20-22-27- | 1-5/8 | 51/2-8-10-12-13-16-18-20-24 | 3-7/8 | 6 |
| 0/10 | 28-32-36-40 | 1-11/16 | 10-12-14-16-18-20-24 | 4 | 8-12 |

HIGH SPEED LEFT HAND TAPS

| SIZE | THREAD | SIZE | THREAD | SIZE | THREAD |
|---|--|--|--|--|---|
| 0 1 2 3 4 5 6 8 10 12 1/4 5/16 | 86 84-72 56-64 56 32-36-40-48 46-44 32-36-40 32-36-40 24-28-32 20-28-32 16-20-24-28-32 | 3/8 7/16 1/2 9/16 5/8 11/16 3/4 13/16 7/8 1 | 16-24-32 14-20-28 12-13-20-28 12-18-20-24 11-12-18-20-24 11-16-24 18-16-18-20 9-12-14-18-20 8-12-14-16-18-20 7-12 | 1-3/8 1-7/16 1-1/2 1-9/16 1-5/8 1-11/16 1-3/4 1-13/16 1-7/8 1-15/16 | 6-8-10-12-16-18-20-24 8-10-12-14-16-18-20 8-10-12-16-18-20 8-10-12-16-18-20 8-10-12-14-16-18-20 8-10-12-14-16-18-20 8-10-12-14-16-18-20 8-10-12-14-16-18-20 8-10-12-14-16-18-20 8-10-12-14-16-18-20 8-10-12-14-16-18-20 |

LEFT HAND AND SPECIAL DIES IN STOCK

Prices on Application **New Sizes Added Frequently**

Oversize taps. Special size reamers. H.S. extension drills. H.S. Taper length drills No. 1 to No. 60—Letter sizes A. to Z. Fractional sizes 1/8" to 1/2" 12" Overall 9" flute length. H.S.S.S. aircraft drills 6" and 12" long. NOTE:

We Specialize In High Speed Cutting Tools

SPECIAL PRICES TO DEALERS

WESTERN TOOL SUPPLY COMPANY

PHONE: RAndolph 6-4113 617-19 W. Randolph St., Chicago 6, Ill:

MONTHLY BULLETINS AVAILABLE -

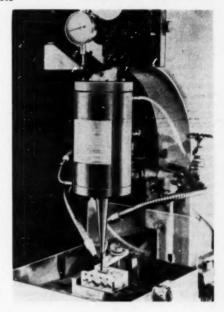
To manufacture Cavitron machine tools

The Sheffield Corp., Dept. MB, Dayton, Ohio, will design, manufacture and market Cavitron machine tools, according to a joint announcement by the Cavitron Corp., Long Island City, N. Y., and Sheffield.

The Cavitron machine tool utilizes an ultrasonic vibrating head and an inexpensive tool (such as soft steel) for the precision cutting of hard and brittle materials, either ferrous or non-ferrous, such as the carbides, germanium, hardened tool steels, sintered aluminum oxide, quartz, industrial crystals, ferrites, various types of glass, ceramics, sapphire, and other materials difficult to machine. It may be used for extremely precise external or internal machining similar to cutting, drilling and grinding of holes, cavities, slots and recesses of any shape, as well as precision forming of external profiles. Extremely fine surface finish is said to be obtained, and there is no local heating of the work surface or chemical or physical change in the work piece.

The operation is accomplished by the use of an ultrasonic tool head vibrating from 18,000 to 30,000 cycles per second.

Use ACTION Card, opposite page 64. Encircle No. 94



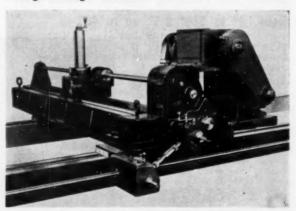
Portable heavy duty milling, facing machine

Forney's Inc., Dept. M, P.O. Box 310, New Castle, Pa., builders of special precision tools since 1916, announce the new Forney portable universal milling and facing machine.

Designed for heavy duty precision milling and facing on jobs too large, or so situated as to make their removal to the machine shop impractical, this machine can be taken to the job.

The new machine's uses extend into many fields, such as resurfacing hammer bases in forge plants, and it is especially adaptable for use on motor bases, bed plates and similar components.

Spindle speeds range from 9 to 72 rpm and cutters from 3" to 15" in diameter can be used. Any surface angle can be



maintained and surfaces up to 84" in width can be accurately milled. Longitudinal travel rails of any length can be furnished.

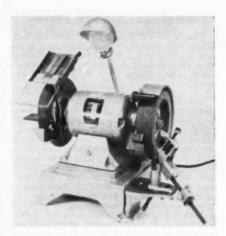
Use ACTION Card, opposite page 64. Emeircie No. 95

Three-in-one all purpose tool and drill grinder

Simplicity, convenience, accuracy and speed are claimed for a new wide range tool and drill grinder introduced by The DoAll Co., Dept. B, Des Plaines, Ill. An unusually wide range of twist drills, from No. 60 wire size to 3/4", are quickly and accurately pointed and sharpened with this new unit. It permits the grinding of point angles from 45° to 75°, clearance angles from 6° to 15° and chisel point angles from 117° to 135°.

Drills are held and positioned in a fixture which simplifies the setting of angles, permitting even inexperienced and unskilled workers to obtain good grinds. The grinder, incorporating a ¼ h.p. ball bearing motor, is equipped with a rough wheel for grinding tools down rapidly to approximate angles. They can then be accurately finished on the other wheel using the fixture. Average time to sharpen a drill is reported to be less than one minute.

Because of a new and patented lip positioner, small drills can be ground more accurately than on conventional machines, it is said. A small drill point gage is furnished so the operator can quickly check the chisel point, clearance

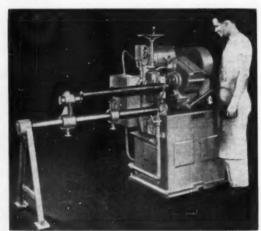


and point angles. The unit is available for bench mounting or with a steel cabinet pedestal. A drip-type applicator can be provided to permit use of lubricant during grinding operations. A tool bit fixture is also furnished to permit the accurate grinding of angles on small lathe tools.

Use ACTION Card, opposite page 64. Encircle No. 98

Milling and centering machine handles work from 3/4" to 31/2" x 5" up to 48"

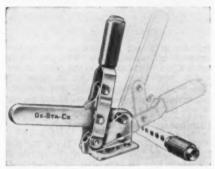
THIS NEW Sundstrand No. O Centrmil milling and centering machine handles work from 34" to 31/2" dia. x 5" to 48" long. Claimed are simplicity and speed of adjustment. After shaft has been located and clamped, the rocker-type milling head mills one end. The milled end is then manually centered with a 3/4" (max.) center drill. Part is reversed and located from center or end previously machined for milling and centering opposite end. Power feed to the center drill and power clamping can be provided if desired. It is suitable for the steel room or lathe department for miscellaneous shaft work. The unit is manufactured by Sundstrand Ma-chine Tool Co., Dept. MB, 2535 Eleventh St., Rockford, Ill.



Use ACTION Card, opposite page 64. Encircle No. 97

Full length bushings for toggle clamps

Detroit Stamping Co., 347 Midland, Detroit 3, Mich., manufacturer of "De-Sta-Co" quick-acting production toggle clamps, has announced a new type of bushing for series 210, 220, 228 and 240. For some years a feature of De-Sta-Co heavy duty types, the new design offers longer life under repeated stress and volume operations in the range from 500 to 800 lbs. pressures. The new bushings



run full length through the clamp bars to provide more bearing surface and are hardened to resist wear. Instead of an ordinary press fit, the new bushing is serrated and locked in the clamp bars so that it will not turn and work loose. The former design was a hardened pin in bushings the thickness of the bar stock.

Use ACTION Card, opposite page 64. Emeircle No. 98

Vertical motor cone-pulley drilling machines

New developments and technical engineering improvements made in their Model B Edlund drilling and tapping machines are claimed by Edlund Machinery Co., Cortland 20, N.Y.

Drilling capacities are \%" for the Model 1B, 1\%" for the Model 2B and 3B and 1\%" for the Model 4B machines. The choice of single or multiple spindles in the Model B lines adds to the versatility of these machines in production work. The 1B is available in 1 to 6 spindle combination, the 2B and 3B in 1 to 8 spindles and the 4B in 1 to 4 spindle combination. The Model 4B in single or multiple spindles is made in both the pedestal and bench type machines. Other models in single or multiple spindles



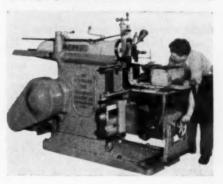
are pedestal type machines with single spindle or a round column base.

Use ACTION Card, opposite page 64. Encircle No. 99

Quick setup for shaper

This 24" standard shaper, equipped with a special tilting table, is claimed to position work so quickly and accurately that setup time is held to a minimum. It is manufactured by Cincinnati Shaper Co., 1234 Garrard Ave., Cincinnati 25, Ohio.

This machine is used in the manufacture of glass molds, and is instrumental in keeping metal removal to a minimum,



thereby increasing the useful life of the glass mold.

The table tilts about a pivot and is driven by a handcrank arrangement, convenient to the operator's position. A quick clamping scheme is also provided to maintain accurate setups.

Use ACTION Card, opposite page 64. Encircle No. 100

Non-releasing tap holder

A new non-releasing tap holder by Barnaby Mfg. Co., 74 Knowlton St., Bridgeport, Conn., and said to be jamproof, features a cylindrical guide for smooth exacting tapping operations. These Barnaby pull-out type holders will monitor the most severe tapping operations without sticking or jamming. They can



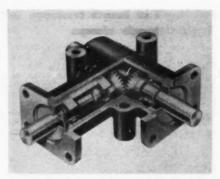
be used on turret lathes as well as screw machines for holding taps while cutting internal threads or on automatic screw machines where a spindle is reversed automatically. Designed to incorporate a small amount of float to correct any slight misalignment; the extra heavy set screw is said to withstand long hard use without stripping. All parts are precision made, hardened for maximum service life.

Use ACTION Card. opposite page 64. Encircle No. 101

Right angle bevel gear units use Coniflex bevel gears

Coniflex bevel gears have been substituted for straight tooth gears to get quieter, cooler operation and maximum service life in Anglgears, the standardized right-angle gear drives that feature small, compact design with high load capacity, according to Airborne Accessories Corp. Dept. B, Hillside, N.J.

For right-angle power transmission through shafting, the Anglgear comes in two standardized models, 1 hp and 1/3 hp, both so small that they fit neatly into a man's hand. Both are strong enough

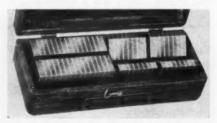


for use in power systems as well as for manual operation. The straight teeth tended to shift pressure to the gears' outer edges, sometimes resulting in shearing and breaking, the manufacturer claims.

Laminated V-blocks, parallels

The George Scherr Co., Dept. B, 200 Lafayette St., New York, N. Y., offers a complete line of magnetic parallels and V-blocks in all sizes and shapes, under the trade name "Magne-Blox." Completely new mass production methods are claimed to result in sayings.

Manufactured of alternate laminations of brass measuring 1-16" and selected



iron laminations of high magnetic capacity measuring 3-16"; these dimensions have been selected so that Magne-Blox may be used on all types of magnetic chucks, including the permanent magnetic type.

Ordinarily, whenever an accurate grinding setup is made, the magnetic chuck has to be re-ground; by grinding Magne-Blox instead, the life of the chuck is prolonged indefinitely.

Use ACTION Card, opposite page 64. Encircle No. 103

Drills right-hand, left-hand parts simultaneously

A new machine which drills right-hand and left-hand parts simultaneously has recently been announced by the Govro-Nelson Co., Dept. B, 1933 Antoinette, Detroit 8, Mich.

The machine incorporates four automatic drilling units. For example, the unit tap-drills two ¼-20 holes in two automobile door handles in one operation at the rate of approximately 600 parts (1200 holes) per hour.

In operation, the operator loads one each of right and left-hand parts, then depresses the start-cycle buttons with both hands, whereupon the work is automatically clamped, drilled, unclamped and ejected.

A standard machine which does away with the necessity if building special machines for drilling radial holes in a great variety of parts also has recently been placed on the market by the company.

Any number of automatic drilling units up to eight may be employed, the units being movable not only through 360 degrees on the circular table but also movable endwise on riser plates to meet the requirements of the part being drilled.





The machine may also be used for tapping operations with Govro-Nelson tapping units. It has a range of 1/32" to %" on drilling operations and 0-80 to %-16 on tapping operations, depending on material and spindle speeds.

Use ACTION Card, opposite page 64. Encircle No. 184

Self-oiling powdered steel bushing

The new R-B powdered steel alloy guide pin bushing is heat treated and



has sealed internal oil wells as an integral part of the bushing. These bushings are shipped to user with oil wells completely filled. No external oiling is required throughout the life of the bushings. Allied Products Corp., Dept. 63, 12621 Burt Rd., Detroit 23, Mich.

Use ACTION Card, opposite page 64. Encircle No. 105

Light weight precision automatic boring bars

A new line of boring bars is over 40 pounds lighter in weight, yet strong aluminum alloy castings and compactness in design provide outstanding speed, precision, rigidity and power, according to Lempco Products, Inc., Dept. B, 5490 Dunham Rd., Bedford, Ohio.

Automatic in operation, the new bars offer automatic retractable cutters, fast automatic down-feed with self-centering full capacity fingers, mechanical reverse, lifetime self-adjusting bear-

ings, variable speed, and motor power sharpener.

Use ACTION Card, opposite page 64, Encircle No. 106

Expanding mandrel improved

Additional patents have recently been obtained on the Le Count "Count-Centric" expanding mandrel manufactured by Le Count Tool Works, Inc., Dept. B, 390 Capitol Ave., Hartford, Conn.

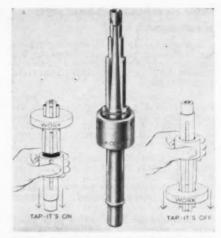
This precision ground arbor is now available in only 11 sizes to accommodate every size bore from \%" to 7".

The work is held by three keys sliding in grooves on a 3° taper. The keyfaces are always parallel, and automatically center the work. The longer gripping surface of the parallel keys prevents marring or distortion in the bore of the work and permits cuts as deep as ¼" in tough steel without chattering.

steel without chattering.

Work is mounted on the arbor quickly by a light tap which slides the keys up the 3° taper, with a secure grip assured by the precision finishing of both keys and slots. A tap at the other end releases the work just as quickly.

The mandrels each have two or three



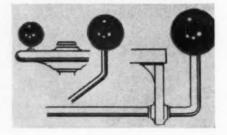
steps, the maximum expansion of each overlapping the minimum diameter of the next, and each mandrel overlaps the next larger size, so that any fractional or decimal size bore can be accommodated within the range of \(\frac{3}{2}'' \) to \(7'' \) with only 11 tools.

An added feature of the "Count-Centric" expanding mandrel is that no arbor press is required to assure a firm grip on the

Use ACTION Card, opposite page 64, Encircle No. 107

Plastic balls tapped in range of sizes for tool lever knobs

The Jergens Tool Specialty Co., Dept. BBC, 712 E. 163rd St., Cleveland, Ohio, has announced the addition of plastic ball lever knobs to its line of standardized components.

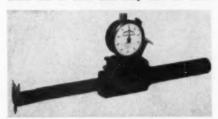


insert, and the 1" has a ¼" tapped hole. These are good thermal insulators, offering good insulation against "electric shock" and resistance to heat and flame.

Use ACTION Card, opposite page 64. Eneirele No. 108

Reliant snap ring groove gages

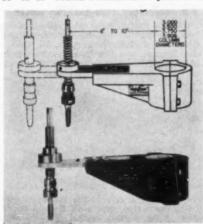
The Reliant dial indicator gages enable one to inspect internal snap ring grooves from .240 to 5.270 dia. May also be used



for checking out-of-round, inside diameters, deep holes, recesses, taper, inside spherical radii. Gaging motion transferred directly through a lever to the gage indicator. Reliant Industries, Dept. B, 4947 Firestone Blvd., South Gate, Calif. Use ACTION Card, opposite page 64. Encircle No. 109

Tapping attachment allows lead screw tapping

A new larger support arm for "Autotap" lead screw tapping attachments features an adjustable slide which permits 16" to 20" round column drill presses to



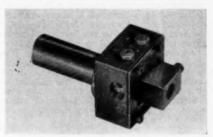
be used for lead screw tapping, according to the manufacturer.

This new 500 Series support arm is available in several models to fit different column diameters. Two sizes of support arms are made for "Auto-tap" ½" dia. and 1" dia. lead screws. ranging from 80 to 11 pitch for No. 0 to 5%" taps. Automatic Methods, Inc., 965 W. Grand St., Div. 118, Elizabeth, N.J.

Use ACTION Card, opposite page 64. Encircle No. 110

Everede new No. 1-50 boring head

New No. 1-50 boring head manufactured by Everede Tool Co., Dept. B, 2000 N. Parkside Ave., Chicago 39, Ill., for use in automatic screw machines and small



turret lathes, is said to permit deep or shallow boring, made possible by lead screw placed off center so the bar length can be quickly and easily adjusted, minimizing "chatter and spring," and further eliminating the necessity for various length bars. Direct reading adjustment saves time . . . calibrated dial on lead screw is divided into 1/1000th's.

Use ACTION Card, opposite page 64. Encircle No. 111

Lightweight polishing head

A "bantam weight" Vonnegut portable polishing head for contour finishing of metal, wood, plastic or ceramic workpieces has been added to the line of Vonnegut, Marschke and "G&P" prod-



ucts of Grinding & Polishing Machinery Corp., Dept. B, 2530 Winthrop Ave., Indianapolis 5, Ind.

The new head weighs two pounds. Featuring 12 brushes and 12 relatively narrow strips of abrasive—each only 1½" wide—and a diameter of 6½"—the head requires less power than the larger 16 and 32 brush Vonnegut heads, permitting the use of smaller power tools. A variety of adaptors are made for applying the head to almost any type of small power tool up to 3 500 press. tool up to 3,500 rpm.

Use ACTION Card, opposite page 64. Encircle No. 112

New-type air-operated collet chuck

Lynair, Inc., Dept. MB, Jackson, Mich., announce an air-operated collet chuck, actuated by means of a heavy-duty air cylinder through a gear train. The collet is held stationary in position at all times. This is accomplished by means of a lock-ring in the bottom of the fixture. The collet is opened and closed by means of a separate sleeve on the outside of the collet. When the collet is once closed on the workpiece, it will not release even though air pressure failure may occur, thus permitting the machining to be completed.

Positive holding of the lightest plastic



to the heaviest steel or cast iron part is claimed, without doing damage to the outside surface, such as o.d. threads, knurls, etc.

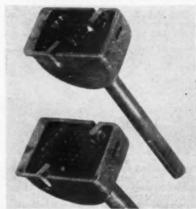
Capacity ranges from 1/16" through 3%". Stock diameter up to 1%" can be passed through collet.

Use ACTION Card, opposite page 64. Encircle No. 113

Heavy duty dresser

The latest Newman product is the heavy-duty dresser just out; nine grades of dressing wheels are made by the company, included the new steel cutters for the heavy-duty dresser.

The design and construction of the

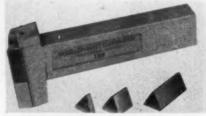


Newman dresser, according to the manufacturer, make it possible to triple the output of the grinding wheel. Thus, an operator can get from 2400 to 3000 successful cuttings using the dressers, where it has been possible to achieve only from 800 to 1000. Newman Grinding Wheel Dressers, Dept. BB, 1001 24th St., Oakland 7. Calif.

Use ACTION Card, opposite page 64. Encircle No. 114

V-R toolholder cuts carbide waste

A new design vertical toolholder has been announced by the Vascoloy-Ramet Corp., Dept. MB, Waukegan, Ill. One of the features is a "ouilt-in" carbide chipbreaker. This is said to provide correct



chip formation over wide cutting range. To sharpen the inserts all that is necessary is to surface grind the ends of the insert. All adjustment, location and clamping is done by one screw on top of the toolholder. Available in 30 different styles and sizes.

Use ACTION Card, opposite page 64, Encircle No. 115

Improved ball action tapping chuck

The Universal tap chuck is easily convertible for releasing or non-releasing work and will tap right or left hand when used on rotating or stationary applications. It has a floating action and uses two Rubber-flex collects to fit all taps from No. 10 to %"; no bushings needed.

Smooth ball action said to minimize tap



chipping, improve thread quality, and maintain accurate thread depth.

Available with 5 different shank sizes, including Morse tapers. Roddick Tool Co., Dept. B, 1023 N. Pauline St., Anaheim, Calif

Use ACTION Card, opposite page 64. Encircle No. 116

Carpenter Stainless No. 3, type 443

This steel, made by The Carpenter Steel Co., Dept. BB, Reading, Pa., is a heat-resisting chromium steel which stands up very well under destructive scaling conditions up to 1600° F, and has better corrosion resistance than Carpenter Stainless No. 6 in certain chemicals on account of its copper content. This steel is widely used for scale-resisting purposes such as furnace parts, soot blower tubes, stirring rods, and ladles for molten non-ferrous metals.

This stainless can be blanked, formed, deep drawn and stamped successfully. In the form of cold rolled strip, it is extremely ductile and lends itself to complicated press work. It can also be forged, headed and upset without difficulty. Preheating to 1400/1500° F is desirable.

Preheating to 1400/1500° F is desirable. The steel machines about like SAE 3145, 3250, etc. In turning operations, 80 to 110 sfm is recommended, Machinability is improved by cold working.

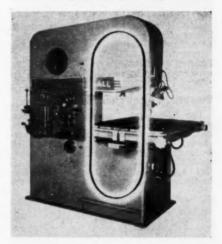
is improved by cold working.

The steel can be welded. When rods are required they should be of similar analysis. It can be brazed and soldered. It is available in forging and tube billets, hot rolled bars and forgings, cold drawn or ground bars, wire and wire rods, strip.

Use ACTION Card, opposite page 64, Encircle No. 117

New band sawing machine and high speed steel band saw

A recent development by the DoAll Co., Dept. BB, Des Plaines, Ill., is the semi-automatic band sawing machine and Demon high speed steel saw band, the first practical high-speed steel had tool. The "Demon Precision" blade is available in three varieties of pitch and five different widths from 1/4" through 1"; the Buttress type tooth is available as "Demon Buttress" in three different pitches and three widths, 1/2" through 1". Its red heat hardness permits two to three times greater band tool velocity than that possible with high carbon



steel blades. Its greater tensile strength allows heavier work feeds and chip loads with no sacrifice in accuracy.

Some of the features of the semi-automatic type of band sawing machine are: Increased horse power; ruggedness and rigidity for the taking of extra heavy cuts; push button machine operation handled from a centralized control panel made possible by sensitive hydraulic power feeds and other hydraulic controls; "in-built" coolant facilities are easily adjusted; wide, infinitely variable speed changes (one typical range, 40 to 10,000 fpm) permits selection of ideal band saw velocity for the job; Job Selector gives proper band machining constants such as type of tool, velocity, feed pressure, cutting rates, etc.

Use ACTION Card, opposite page 64. Encircle No. 118

High precision double column way grinders imported from Germany

High table speed and wet peripheral grinding with profiled wheel are said to contribute to maximum efficiency, in the new Schmaltz type APF double column way grinders, which can also be used as regular surface grinders.

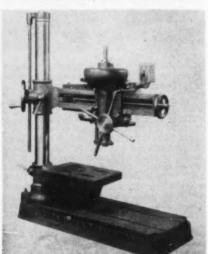
With extensive ribbing in all supporting members, they are available

bers, they are available in four sizes ranging from 31½" to 59" in grinding widths, 59" to 26'3" in grinding lengths, with a standard grinding height of 39" (increased height optional). Powered by motors up to 30 hp, they accommodate workpieces up to 17,600 lbs. Parker Machine Co., Inc., Dept. BB, 158 Pioneer St., Brooklyn 31, N.Y.

Use ACTION Card, eppesite page 64. Encircle No. 119



The Cleveland Tapping Machine Co., subsidiary of Automatic Steel Products, Inc., Dept. B, Canton, Ohio, having purchased the Munding bench radial drill from The Munding Machine Co., Glendale, Calif., now manufactures and sells this article as the Cleveland-Munding bench radial drill, said to combine the





convenience and accuracy of a sensitive drill, the range and capacity of a large drill with the speed and flexibility of a radial drill.

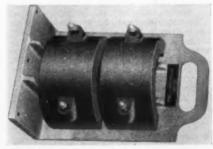
The bench radial is equipped with a 3\%" dia. column, has a 24" arm. Capacity in tool steel—\(\frac{1}{2}\)". Vertical travel of arm on column of 25" and horizontal travel of head on arm of 18". Spindle travel of 6\%" and No. 2 m.t. in spindle. The spindle has 8 speeds from 160 to 3140 rpm and is equipped with a 1/3, \(\frac{1}{2}\) or \(\frac{3}{4}\) hp motor.

Use ACTION Card, opposite page 64. Encircle No. 120

Extra heavy duty self-contained magnetic separator, separates 1/4" steel plates

The new extra heavy duty Basco magnetic separator will automatically separate steel plates up to ¼" thick, to speed feeding into presses, shears and other metal fabricating machinery, according to the manufacturer.

Stacks of plates up to 8" high can be



handled; it will separate round, square, nested or odd shapes, painted or highly polished. Basco Mfg. Co., 5 Woodside St., Dept. B, Stamford, Conn,

Use ACTION Card, opposite page 64. Encircle No. 121

New 8 foot press brake

A new press brake said to be of unusually strong construction and high precision has been announced by Service Machine Co., Inc., 204 Miller St., Elizabeth, N. J. The company has been manufacturing brake dies for more than 34

This 8 ft. brake is designated as Semco



model 800 and is in addition to the 6 ft. brake announced recently. The frame is of one piece construction, machined in one piece and normalized for relief of strain and to insure accuracy. Some of the dimensions are: Overall heights 79"; overall depth 44"; depth at base 36"; width at base 64"; distance from floor to bottom of throat 30\%"; stroke 3"; ram adjustment 4½"; strokes per minute range from 16 to 40; motor 1½ h.p.; r.p.m. 1800; bending capacity 96" 16 ga.

For the high temperature cycle, an

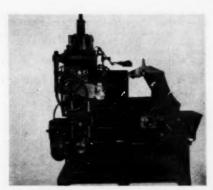
automatically controlled, water-proof, ex-plosion-proof heater is used.

The test chamber of the unit is equipped with a fan for controlled air flow and uniform temperature distribution, A temperature recorder is also provided. Floor space is 71/2 sq. ft.

Use ACTION Card, opposite page 64, Encircle No. 125

Elliptical head shear and flanging machine

The elliptical head shear and flanging machine, Model 49, for truck and trailer tank heads, manufactured by Blue Valley Machine & Mfg. Co., 6832 Truman Rd., Kansas City 3, Mo., is said to flange all thicknesses of flanging material up to 3/16", or high tensile material up to 10



ga. in all type and shaped heads-round, flat, standard dished or reversed dish. Head circumference is held to a variation

of 3/16", it is claimed.

Both shear and flanger are operated from the same controls. Before flanging, the head is sheared to size and shape from the same template, without remov-ing it from the machine. Heads are finished, ready for the tank, when they come off the machine.

Use ACTION Card, epposite page 64, Encircle No. 126

New optical comparator

New precision optical comparator, Model R-300, announced by the Portman In-strument Co., Inc., Dept. BB, Town Dock Road, New Rochelle, N.Y.

"Multi-Phase" optical system, according to manufacturer, projects upright, properly oriented image with exceptional definition and screen brightness, with long focal lengths at every magnification providing exceptionally large working



space clearance between the lenses and the object stage platform. Lenses to provide magnifications of 10X, 20X, 25X, 31¼X, 40X, 50X, 62½X, and 100X obtainable as standard equipment.

Use ACTION Card, opposite page 64. Encircle No. 127

Three new types of drill jig bushings

American recently announced the production of three new types of drill bushings. Their new Deltagrip and Hexagrip drill bushings are made especially for use in castable materials such as cerromatrix, plastic, etc. Because of their design they can't slip or rotate in the material cast



around them. The Serragrips are used in fibreglas, wood, etc. American Drill Bushing Co., Dept. B, 5107 Pacific Blvd., Los Angeles 57, Calif.

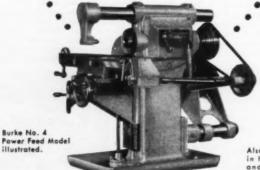
Use ACTION Card, opposite page 64, Encircle No. 128

STURDY

ACCURATE - ECONOMICAL

BURKE BENCH MILLERS

are so amazingly versatile they can almost reproduce themselves. Thousands in service in tool, school, development, repair and mass production shops.



Also available in hand-feed and universal models.

Send for complete data on models, specifications and accessories.

THE U. S. BURKE MACHINE TOOL DIV.

Brotherton Rd. 1, Cincinnati 27, Ohio

12,000 sfm for platen grinder

Among several new machines made for the Curtis Machine Corp., Dept. B, 1300 E. 2nd St., Jamestown, N.Y., by an affiliate company in Germany is the KGB 310 platen grinder.

The machine, which has both platen and contact roll, is equipped with a serrated rubber contact belt minimizing glazing



or loading of the abrasive belt with its high speed impact action; permits platen grinding with fine grit coated abrasive belts maintaining fast cutting action with resulting fine finishes. The 2-speed motor develops belt speeds of 5,000 sfpm and 12,000 sfpm. The top speed is designed for fast and substantial stock removal.

Use ACTION Card, opposite page 64. Eneirels No. 129

High frequency induction heating unit

A redesigned 5 KW output high frequency induction heating unit (Model L1-5A-1) is offered by Lindberg Eng. Co., 2449 W. Hubbard St., Chicago, Il., for soldering, brazing and light heat treating applications.

The basic redesign incorporates a heavier sheet steel cabinet. Interior steel partitions are provided to isolate oscillator, power and control components which are accessible for inspection through large access doors.

Indicating lamps have been relocated to the cabinet front. These externally located lamps instantaneously reveal any abnormal operating conditions at any of the many protective devices.

The temperature controlled water cool-

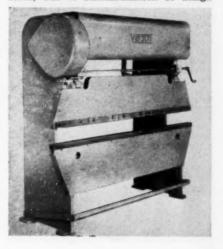


ing system has been redesigned to reduce water consumption and to eliminate any possibility of moisture condensation on internal components and work coils.

Use ACTION Card. apposite page 64. Eneirle No. 130

Verson standard press brakes available from stock

Verson Allsteel Press Co., 9303 S. Kenwood Ave., Chicago 19, Ill., has announced two standard press brake models that are available for immediate delivery from stock. due to standardization of design



and construction and by building the

brakes in quantity.

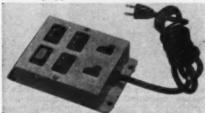
brakes in quantity.

No. 1062, 25 tons capacity, bends 78" of 16 ga. mild steel over a ½" die opening; Model 16-48 rated at 15 tons capacity, bends 48" of 16 ga, mild steel over a 1/2 die opening.

Use ACTION Card, opposite page 64, Encircle No. 131

Portable outlet box with toggle switch controls

Wired complete with 3 outlets, one hot, 2 controlled by toggle switches, rated 10 amperes at 125 volt AC-DC. Red signal light illuminates when plugged in. Eighteen-gage steel case supported on 4 rubber feet. Equipped with 6 ft. SJ No. 16

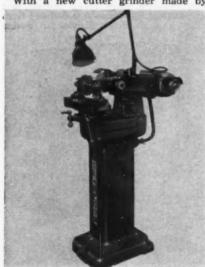


two conductor rubber covered cord with molded rubber two-prong plug. The Fostoria Pressed Steel Corp., Dept. MTB, Fostoria, Ohio.

Use ACTION Card, opposite page 64. Encircle No. 132

Clarkson cutter grinder

With a new cutter grinder made by

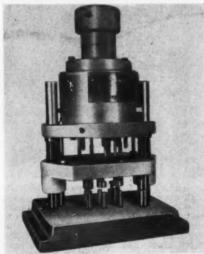


Clarkson, it is claimed that cutters can be set and completely sharpened in from 15 to 25 minutes according to type. Powered by a 1/2 hp motor, the grinder is always operated from the front. Clarkson, Inc., 320 Ontario St., Toledo, Ohio.

Use ACTION Card, opposite page 64, Encircle No. 133

Self-clamping drill jigs

Zagar has designed and standardized a complete line of self-clamping drill jigs to be used in conjunction with Zagar gearless multiple spindle drill heads. These jigs can be used with the drill heads to perform drilling, reaming and tapping on standard drill presses and tap-



ping machines. Four distinct types accommodate various sizes of workpieces, handling hole patterns from 3" to 15" dia. Zagar Tool, Inc., Dept. B, 24000 Lakeland Boulevard, Cleveland 23, Ohio.

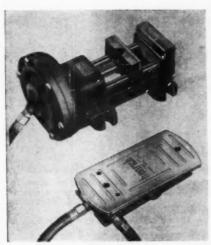
Use ACTION Card, opposite page 64. Encircle No. 134

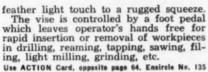
Heinrich tools introduces new air vise

Heinrich Tools, Inc., Dept. 264, 1536 Clark St., Racine, Wis., manufacturer of the "Grip-Master" screwless vise and fixture lock and other precision machine tools, announces the addition of the new Model 33 air vise.

Gripping with a force 15 times air line pressure, the 3" width vise jaw is infinitely adjustable to a maximum opening of 31/8", with a maximum travel of 3\".

It operates from either air line or compressor at a maximum operating pressure of 150 psi. Air regulator (available as accessory) permits grips ranging from a



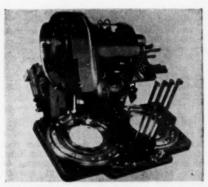


Bliss strip feed press operates at 300 spm

The new Bliss automatic strip feed press, used to produce sanitary can ends and closures, was designed for high-speed operation. In long test runs at the plant in Hastings, Mich., it is said to have operated satisfactorily at speeds beyond 300 strokes per minute.

In conjunction with the new strip feed press, identified as No. 1831, Bliss also has





announced a new automatic double-end curler used to curl can ends. The curler, No. 20, is claimed to give 270° of curling time for each can end. E. W. Bliss Co., Dept. MB, Hastings, Mich.

Use ACTION Card, opposite page 64. Encircle No. 136

Famco announces new foot, air and power squaring shear line

An entirely new, redesigned squaring shear line expanded to 18 models available in 8 power-driven, 6 foot and 4 air types has just been announced by the Famco Machine Co., 3132 Sheridan Rd., Kenosha, Wis. Capacities range from 20 to 14 gage mild steel in 22" to 72" sheet widths. Special knives available for plastics and paper shearing.

Of all-steel box-type construction, two features include: completely reversible 4-edged alloy steel knives; all-steel bed and upper knife frame of box-type construction especially made to eliminate

The foot shear line is built to cut 16 and 18 gage mild steel in 36", 42" and 52" widths, and 18 gage in 22", 30" and 72" widths. Convenient steel treadle extending entire length of shear is sturdily rein-



forced by steel torsion bar to prevent twisting.

The new air shears cut 16 gage mild steel in 36", 42", 52" and 72" widths. They are piped and shipped ready for operation complete with all air equipment.

tion complete with all air equipment.
Famco's all-new power-driven shear line features the fast acting "Electromatic" clutch, electrically controlled 9-point jaw clutch.

Use ACTION Card, opposite page 64, Encircle No. 137

High speed ram type vertical miller

The Horix high speed ram type vertical milling machine, designed for tool room experimental work as well as light, higher precision production, is said to have accuracy combined with smooth finish and easy operation as its interesting features. It can do standard and three-dimensional duplications.

Operating to capacity, cutters up to 1½" dia. in steel and larger hard alloy



cutters in soft materials are employed; longitudinal travel of table, cross travel of saddle and vertical travel of knee—all equipped with power and power rapid traverse movements. United Machinery Sales Co., Dept. MB, 2351 N. St. Louis Ave., Chicago 47, Illinois.

Use ACTION Card, opposite page 64. Encircle No. 138

V-notching arc-fit

A precision tool for "V" notching angle iron to give a full 90 degree bend has been announced by the makers of Arc-Fit pipe and tube notchers. Tool, consisting of punch, die and die set, will notch angles up to and including 3" x 3" x 3", x 3", also flat stock of 3" thickness. Sharp, smooth cuts with no deformation of stock.

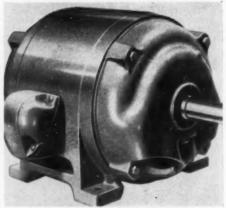
Unit is available with or without liner



pins. Special units in smaller sizes for use in hand or power presses available. Vogel Tool & Die Corp., 1811 North 32nd Avenue, Melrose Park, III. Use ACTION Card, opposite page 64. Encircle No. 139

New motor of advanced design

A motor with new features, conforming with NEMA specifications, is announced by U. S. Electrical Motors Inc. By increasing precision of manufacturing processes, holding tolerances to closer limits and improving the electrical characteristics, this new motor, designated as Uniclosed, Type H, in various sizes, is more compact than previous models. One outstanding feature is its complete dripproof design which also offers splash-



proof protection without increased cost. The frame is solid, one-piece cast iron and the stator is pre-wound. U. S. Electrical Motors, Inc., Dept. BB, Box 2058, Los Angeles 54. Calif.

Use ACTION Card, opposite page 64. Encircle No. 140

Black granite parallel straight edges

Parallel straight edges made of diabase (black granite) in matched pairs have been developed by Rahn Granite Surface Plate Co., Dept. BB, 639 N. Western Ave., Dayton 7, Ohio. Photograph shows pair 36" x 6". Top edges, 12" long, have been finished parallel to the 36" edges and both pieces are the same height within a tolerance of .00005". The 36" edges are also straight within .00005".

Use ACTION Card, opposite page 64. Encircle No. 141





MAGNI-FOCUSER

Has fine ground lenses of optical glass. Neutralizes eye strain from close work. Bimecular design gives third

dimensional vision. Allows freedom of both hands. Wear over glasses. Plastic frame with adjustable headband.

SIZES: 20" focal light. 116 power -14" focal lyth., 1½ power, 19" focal lyth., 2½ power, 2½ power, 2½ power, price ouch ONLY

OTC TOOLS See our complete line. Pullers for Geors, Bearings, Wheels, Pulleys, Bushings, Shofts, etc.

NEW 10 TON HYDRAULIC PRESS

Use this Press in the Shop or take it with you on the job. Frame is 4" welded channel iron. Has 4%" stroke, 2½" diam. rom. Valve aperates pistan in both directions. Adjustable platform. Positive power Hand Pump with handle, 2000 PSI pres-

HYDRAULK EQUIPMENT

at types and sizes. These can be adapted wherever tramendous power is nee to push, pull, heist, mould ar drive, etc.

pressure as abrained from our hydraulic pt Will produce up to 40,000 lb. thrust with PSI. Can also be used on a low pres-sure air system. Has 4" bers; 18" 26 stroke; 30%" long, ideal for shap.

Port No. 29

HYDRAULIC HAND PUMP rating pressure 1500 PSI.

Cop., 1.5 cu. in per /275

AULK ACCUMULATORS A-28 FLOATING PISTON

TYPE - 4"x 18 Built to stand 2,000 PSI

A-5 VICKERS - 10" dia. Ball type. Built to 2450 stand 2000 P.S.I.

NOTE: Stocks include bargains in Hyde Pumps - Volves - Maters - Boas well as Oil, Water and Fuel P

320 PAGE-1954 EDITION

Pocked with SENSATIONAL VALUES IN GOV'T SURPLUS - FACTORY CLOSE-OUTS - and GENERAL MERCHANDISE. Fully priced and Illustrated. Thousands of Items in Machine and Industrial Tools - Hydroulic Equipment such as Cylinders, Pumps, Valves, Motors, Fittings, etc. Bargains in Electric Motors, Generators, Blowers, Parts, etc. Also Hand and Power tools, Precision Instruments, Beerings, Hase Clamps, Winches, Feam Rubber, Microscopes, etc. ALL AT PALLEY BARGAIN PRICES - PRICED TO SELL!

Palley SUPPLY

SIZE:

60" high

2T' wide

2263 E. VERNON AVE.. Dept. MTB-5 LOS ANGELES SE, CALIF.



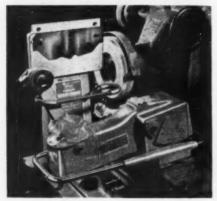
F.O.'s excepted from D&B

No. 2 Diaform designed to handle medium sized work

A new medium sized Diaform wheel forming attachment is now being marketed by Pratt & Whitney, Div. Niles-Bement-Pond Co., Dept. B, 22 Charter Oak Blyd., West Hartford, Conn.

Oak Blyd., West Hartford, Conn.

Designed to simplify form-truing of grinding wheels up to 14" in diameter, used for grinding dies, punches, flat or circular forming tools and similar forms;



trues form up to 2" wide and 1" deep in one setting. Basic construction is vertical pantograph—operated by tracing a template to guide a truing diamond across the face of the grinding wheel on a 5 to 1 ratio; portable, may be placed on magnetic chuck or strapped to the table of the grinder.

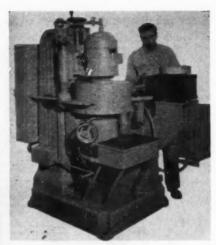
Use ACTION Card, opposite page 64. Encircle No. 145

Automatic operation of new grinder permits high production rate

1200-1400 oil pump eccentric rings per hour are ground on the two parallel faces on this new No. 905-18" double vertical spindle grinder, according to Besly-Welles Corp., Dept. B, Beloit, Wis.

Except for loading and emptying hoppers, the entire operation of the grinder is automatic. The rings are hopper fed into a continuously rotating feed wheel which in turn carries the parts between two abrasive wheels. Both faces of the rings are ground simultaneously, removing a maximum of .009" of stock. Accuracy is held to .002" for size and .0003" for flatness and parallelism. After grinding is completed, the rings are unloaded by gravity into a discharge pan.

Should a part fail to properly enter the



feed wheel, a radially mounted arm releases a limit switch and breaks the electrical circuit to the fixture drive motor.

Grinding is done wet with coolant conducted directly into the grinding zone through the upper motor spindle.

Use ACTION Card, opposite page 64. Encircle No. 146

Air pencil die grinder

The Rotor D-03 air pencil die grinder manufactured by the Rotor Tool Co., Dept. B, 26300 Lakeland Blvd., Cleveland 23, Ohio, has all steel construction, 3 bladed air motor (not a turbine), power at high speed, special select ball bearings, one piece spindle, sliding sleeve throttle,



tool post holder and steel heads without throttle available.

Specifications are: Weight, 13 ounces; length, 5¼ inches; diameter, 1"; speed 40,000 rpm; ½" or ½" collet.

Use ACTION Card, opposite page 64. Encircle No. 147

Band file replacement segment

Adaptable to new production techniques and incorporating new file segment joint design, a new file band is being made available as a replacement item; by an ingenious combination of miters, bevels, and half-lap end construction, the file segments align themselves and join in such a way as to present the



equal of a solid file to the work, and present an angular, rather than a straight joint between segments. This patented skew, or angular joint, results in a smooth skew cut without bump or chatter. Boice-Crane Co., 936 Central Ave., Toledo 6, O. Use ACTION Card, opposite page 64. Encircle No. 143

Self-aligning rest-pad

A new, automatically self-aligning restpad for jig and fixture work, the Screw-Ball clamp, has been introduced by Vlier Eng., Inc., 4552½ Beverly Blvd., Los Angeles 4, Calif. It utilizes ball-



bearing construction for frictionless, automatic angle adjustment and rotation. Use ACTION Card, opposite page 64, Encircle No. 144

MAKE SPRINGS

in a jiffy!

Blaner Universal Hand SPRING

2052443

Write for your Circular.

Here's a profitable tool room unit. Quickly makes hundreds of sizes of springs. Sturdy, de-

pendable . . . a real time and money-saver. No. 3 size winds up to 11/8" O.D. Costs only \$36.00

THE BLANER MANUFACTURING CO. 307 MUNROE FALLS AVE. CUYAHOGA FALLS, OHIO

MODEL UE-S



the "Sight Feature"

ENGRAVING MACHINE is easy to use. It's the PREIS-*PANTO MODEL UE-3

Built so operator can see what he's doing.

Very free operating but extra sturdy.

Excellent for engraving plastic, other materials and steel including steel stamps and dies.

Easily converted for Electric Marking or Acid Etching.

Write today for UE-3 literature and prices.

*TRADE MARK Rog. U. S. Pat. Off.

H. P. Preis Engraving Machine Co. 647 U. S. Highway 22, Hillside, N.J. Versatile milling fixture

Hart milling fixtures are said to eliminate the labor and expense of making up special jigs and fixtures for hundreds of different jobs on miller, shaper, drill press and tapper. Produced and sold by Walter W. Field & Son, Dept. B, 41 Hayward St., Cambridge 42, Mass. Hart milling fixtures are easily attached to the machine, will hold round, hexagonal, octagonal or square stock in any position,



and by their versatility materially reduce setup time. They are available in four sizes, from the ¾" model with capacity from ½" to 1½", to 4" size with capacity from 2½" to 4½".

Use ACTION Card, opposite page 64. Encircle No. 148

New type pad for mounting machinery

A new type of machinery mounting pad, for machines which must remain extremely level during operation, is said to have a greater firmness or density and



has been successful in test installations of precision machines such as light and heavy lathes, grinders, milling machines, planers and jig borers. Designated as Type T "Unisorb," the material is available %" thick and is said to carry a load of 75 to 125 lbs. psi. Resistant to petroleum products, mild acids and moisture conditions. The Felters Co., Dept. BB, 210 South St., Boston 11, Mass.

Use ACTION Card, opposite page 64. Eneirele No. 149

Improved Grind-All fixture

Harig Mfg. Corp., Dept. MB, 5757 W. Howard St., Chicago, Ill., is currently producing a new improved version of their Grind-All fixture. Designed for faster, more versatile, more economical perforator grinding operations; grinds all types of regular and irregular contours concentric with perforator shank within plus or minus .0002.

Due to an exclusive radius generating



feature, the fixture is particularly adapted to carbide grinding. Accuracy is gained through 24 15° graduations on a rotating index plate. Adjustable stops permit a swing to any number of degrees.

Use ACTION Card, opposite page 64. Encircle No. 150

Free machining steels

Latrobe Steel Co., Dept. B, Latrobe, Pa., announces that the "free-machining" properties of its "Olympic FM" airhardening high production die steel have been extended to its entire line of high carbon-high chromium die steels which now can be obtained as FM (free-machining) steels.

This new development involves the company's "Select B," an air-hardening A-2 type steel; "GSN," an oil-hardening steel of the D-3 type; "Cobalt Chrome," air-hardening D-5 type, and "BR-4," an air-hardening, super abrasion resistant die steel.

Use ACTION Card, opposite page 64, Encircle No. 151

Supersensitive drilling machines with micrometer controls for the location of holes

The Hamilton Tool Co., Dept. B, Hamilton, Ohio, offers, for its supersensitive small hole drilling machines, a micrometer control for the positive location of holes in the precision drilling of small units. This equipment is said to locate one or a series of holes by this method, assuring accurate positioning from center to center. The machine illustrated is the Hamilton "Maxi Jr," with drilling ca-



pacity of .004" to .3125" in all drillable materials, Its clearance from center of chuck to column is 5" and from base to chuck is 10". Its spindle speeds range from 750 to 8750 rpm.

Use ACTION Card, eppesite page 64. Encircle No. 152

Lufkin master precision level designed for accurate setting, erecting, and testing

As precision alignment is essential to exact duplication of parts and is also an important factor in preventing excessive machinery wear, the new Lufkin master precision level, Number 59, is said to have wide application in the metalworking industry.

The ground and graduated vial is of ten second accuracy, with one division equal-



ling .0005" per foot. Screws have 64 threads per inch for fine, positive adjustments. Auxiliary level shows lateral position.

This level is 15" long, 3" high, 1½" wide, and weighs approximately 6 lbs. The Lufkin Rule Co., 1734 Hess St., Saginaw, Mich.

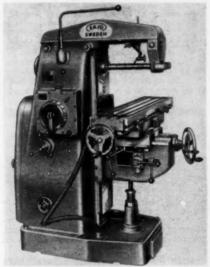
Use ACTION Card, opposite page 64. Encircle No. 153

New Swedish milling machine

Austin Industrial Corp., U.S. distributor for A. B. Sandens Mekaniska, Varnamo, Sweden, announces availability of the Sajo Model 53 all-geared milling machine, their latest addition.

The Model 53 is comparable in capacity to a No. 2 light duty horizontal milling machine. It has 41-11/32" x 9¼" table working surface, 3½ hp motor, 16 spindle speeds from 39 to 1500 rpm (31 to 1200 rpm optional) and 12 independent power feeds, longitudinal, vertical and transverse.

It features quiet, anti-friction, all-geared transmission; spindle speed and table feed



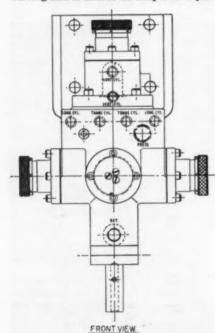
selectors on direct reading dials; spindle start-stop-brake lever adjustable for easy accessibility from operating position; safety clutch for protection of feed mechanism; outside adjustment to split nut to eliminate backlash in climb milling, and simplified lubrication system. Austin Industrial Corp., Dept. MB, 76 Mamaroneck Ave., P.O. Box 430, White Plains, N.Y.

Use ACTION Card, opposite page 64. Engirele No. 154

Precision hydraulic tracing control valve

A new, high precision hydraulic control valve, known as the Trace-Master, has been developed by the Hydraulic Research and Mfg. Co., Dept. B, 2835 N. Naomi St., Burbank, Calif.

The valve incorporates pilot pressure valving and is said to be simple to adjust



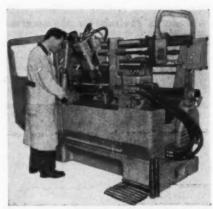
to close tolerance work. Especially designed for vertical mills, spar mills, horizontal mills, boring mills, and other machine tools suitable to contour machining.

Use ACTION Card, opposite page 64. Encircle No. 155

French lathe to be manufactured here

H. E. B. Machine Tools, Inc., Dept. B, 475 Fifth Ave., New York 17, N.Y., announces that arrangements have now been completed for the manufacture of H. E. B. automatic copying lathes in this country. They are to be built by Industrial Metal Products Corp., of Lansing, Mich., and will conform completely to the J.I.C. standards in use throughout the automotive industry.

H. E. B. Machine Tools, Inc., have pre-



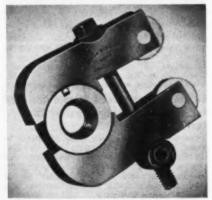
viously imported their copying lathes from their parent company, H. Ernault Batignolles, of France.

Use ACTION Card, opposite page 64. Entirele No. 158

Cross slide knurling and thread rolling tool

A new tool with floating, self-centering feature designed to compensate for any center misalignment, is said to be simple and easy to adjust, its design permitting knurling and thread rolling close to the collet.

Developed for single spindle automatics,

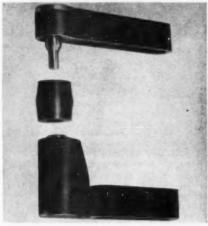


this tool can be used on either front or rear cross slide. It is also adaptable to multiples, hand screw machines and turret lathes; 3 sizes 0" to 1¼". Boyar-Schultz Corp., Dept. MB, 2110 Walnut St., Chicago

Use ACTION Card, opposite page 64. Encircle No. 157

R-B retainer adjustable for positioning flexibility

This new addition to the R-B retainer line is easily adjusted to any desired position on T slotted or drilled and tapped commercial die sets, according to the



manufacturer. Stripping is accomplished with R-B rubber strippers or R-B rubber covered springs. This eliminates strippers, retainer screws and springs. Allied Products Corp., Richard Brothers Punch Div., 1560 East Milwaukee Ave., Detroit 11, Mich.

Use ACTION Card, opposite page 64, Encircle No. 158

Polishing stand for optical polishing paper

A new portable polishing stand made by Crane Packing Co., Chicago, designed to eliminate difficulties experienced when attaching and holding flat any optical



polishing paper on a metal plate, has been announced; a complete 50 yd. roll of 12" wide optical paper can be made available for immediate use. The paper is held in a recess at one end of the unit and is threaded across a steel plate or "stage" that has been lapped to a high degree of flatness. By means of a simple clamping arrangement, a 12" x 12" section of paper is rigidly held in place on the stage. This is said to offer a decided advantage over metal polishing plates when polishing materials where paper is practical, since it eliminates the need to check plate for flatness and time spent in re-lapping. It has been primarily de-veloped for polishing work pieces prior to inspection during surface grinding or lapping operation, in laboratories, or on small run polishing jobs.

The company also announces Plastic Lead Seal pipe thread and gasket sealing compound in 1 lb. brush top cans. Advantages of the brush permit working the compound into the threads.

Plastic Lead Seal is an Underwriter's approved permanent, yet non-hardening sealing compound which allows easy disassembly of connections. It withstands pressures up to 6000 psi, temperatures to 500° F., and is insoluble in water, steam, gas, refrigerants and all petroleum products. Crane Packing Co., Dept. MBW, 1800 Belle Plaine Ave., Chicago, Ill.

Use ACTION Card. opposite page 64. Englirle No. 159

All-purpose flexible abrasive wheels

Flextex mounted points, straight wheels, depressed center discs, and cutoff wheels, for roughing and finishing material in



one operation, is a blending of abrasive grains, synthetic fibres, and a specially developed binding agent. Resilient and flexible, these abrasive products absorb shock, reduce chatter, and resist loading, according to Metal Removal Co., Dept. B, 1546 N. Orleans, Chicago 10, Ill.

Use ACTION Card, opposite page 64. Encircle No. 160

Edlund model 2F features advanced design

A new variable speed drilling and tapping machine manufactured by the Edund Machinery Co., Dept. 20, Cortland, N.Y., was designed and built under shop conditions with production increases of 25 percent being claimed.

The infinitely variable speed drive allows the operator to select correct speeds



instantly. An indicating dial shows the speed selected, 200 to 3600 rpm; with the back gear attachment an additional range of speeds from 50 to 900 r.p.m. is obtained. The capacity of the machine with back gears is %" for steel, 1¼" for cast iron. Models with 8" and 15" overhang and from one to eight spindles are available in the pedestal and column type machines.

Demagnetizer

Complete demagnetization of any shop item is quickly accomplished with the new, round, coil-type demagnetizer just developed, according to L-W Chuck Co., Dept. B, 23 S. St. Clair St., Toledo 4, Ohio.

Use ACTION Card, opposite page 64. Encircle No. 169

Magnetism may be removed from tools, such as drills and reamers, and small production parts or work which has become demagnetized through induction. The opening is 3¾" in diameter and un-



obstructed to accommodate parts up to that dimension. The quick passing into the opening is sufficient to completely demagnetize the object affected. No contact with the part is required.

Use ACTION Card, epposite page 64. Encircle No. 170

Six inch dry carbide tool grinder

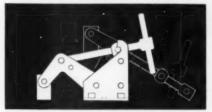
A new 6" "dry only" carbide tool grinder, Model D-6, has been announced by Hammond of Kalamazoo. The D-6 incorporates many of the features of their large 10" and 14" machines. Some of the features of the D-6 are: Safety cup disc (patented) completely fills the open cup of the wheel and prevents hand injuries and dropping a tool into the cup of the wheel; D-6 is equipped with exhaust type wheel guards; to compensate for wheel wear, tables adjust "in and out" by means of a screw feed; wheels are quickly and easily changed; two operators can grind tools at the same time with freedom of movement and unobstructed vision. For further information write: Hammond Machinery Builders, Inc., Dept. BB, 1614 Douglas Ave., Kalamazoo 54, Mich.

Use ACTION Card, opposite page 64, Encircle No. 171



Saxton Kant twist clamp

This clamp provides clamp pads with three different gripping surfaces: smooth face, v-groove and diamond face, to suit all types of holding operations. Positive parallel action of the cantilever jaws eliminates damage from wracking stress. Also featured is a spring-bearing trunion, which is torque-converting and completely eliminates distorting, twisting action. The trunion also absorbs vibra-



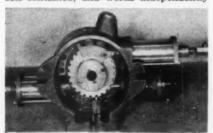
tion. There is no unsupported screw or loose pad to "walk-off-center" when pressure is applied against the anvil. The horizontal position of the screw provides a completely new freedom of motion in all clamping operations. Available in five different sizes from 1½" to 12". Write Centinela Industrial Supply Co., Dept. BB, 11930 Inglewood Ave., Hawthorne, Calif.

Use ACTION Card, opposite page 64. Encircle No. 161

Speed indexers have integral shock control unit

Erickson Tool Co., Dept. B, Cleveland, Ohio, states that a built-in protective device, an integral shock control unit, is easily adjustable to meet requirements of varying loads. It is said to assure constant, uniform feed while allowing maximum speeds without danger of damage to the mechanism or work.

The piston of the control unit is linked directly to the indexing mechanism, is self-contained, and works independently



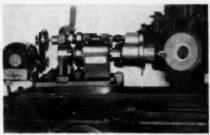
of the actuating fluid. The standard 24 position index plate allows an indexing range of 4, 6, 8, 12, and 24 positions. By the use of special indexing parts, up to 100 positions can be obtained. For accurate 120° positioning, there is an Erickson 3 position indexer.

Use ACTION Card, opposite page 64, Encircle No. 162

Circularity grinding attachment

Detroit Reamer & Tool Co., Dept. MB, 2830 E. 7 Mile Rd., Detroit, Mich., announces the Model 500 Circularity grinding attachment, said to be faster, easier to handle, with positive control, greater adaptability, rugged construction.

Motor driven, the attachment simultaneously revolves the work to be ground and moves it longitudinally back and forth. This simultaneous operation is the result of direct gear drive from drive



shaft to collet housing gear and spacer

Standard spacer gears with a follower pin for each flute to be ground provide indexing for 2, 3, 4, 6, 8, or 12 flutes. Special spacer gears can be provided. Use ACTION Card, opposite page 64. Emeirele No. 163

New dust collector

The newly developed Amerjet dust collector is a reverse jet fabric collector designed for those applications where extremely fine particles are involved or where the material must be collected in a dry state for reclaining.

The cleaning media is automatically reconditioned by a jet of high pressure air forced through the cloth in opposite direction to the flow of the air being cleaned. Because the cleaning cycle is continuous, the unit maintains a constant pressure drop and thus a steady air volume at the exhaust points.

This method of media reconditioning is said to permit much higher velocities through the cleaning tubes. Therefore, less filter cloth is needed. American Air Filter Co., Inc., Dept. B, Louisville 8, Ky. Use ACTION Card. epposite page 64. Eneirele No. 184

Alligator shears in nine sizes

Alligator shears made by Hendley & Whittemore for shearing flat, square and round bars, reinforcing rods, high carbon steel bars, rail stock, etc., have beltdrive, adjustable holddown and one set of shear blades as standard equipment. They can also be furnished with extended levers to carry top cutting blades the same length as the lower blades. All machines can be furnished without clutch and with gear

keyed directly to the eccentric shaft for continuous operation.

Nine models are available with blade sizes from 4½" to 15". All of the machines can be made portable. These are regularly furnished with hand lever clutch shifter; a foot lever can be substituted when wanted. All can be arranged for motor drive. Shown is the No. 2½ with a capacity of 2½" in rounds, 8" x 1" flat mild steel. It is equipped with an I-beam base and V-belt motor drive. Smaller sizes are available on special order. The blade sizes are 10" and 15" and the weight is 8,400 lbs. Floor space required is 105" x 65". The motor is 10 hp with flywheel revolution of 225 rpms. Hendley & Whittemore Co., Dept. B, 100 Blackhawk Blvd., Beloit, Wis.

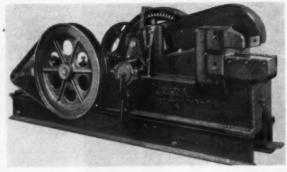
Use ACTION Card, opposite page 64. Encircle No. 122



Pictured here is a compact Hammond grinder - polisher using abrasive belts.

The mounting structure is attached to the base of the polishing lathe to which the backstands are mounted, instead of the more conventional method of mounting the backstands in back of the lathe.

Abrasive belts up to 14' long can be used on the Model VRO variable speed



(1500 to 3000 rpm) and the backstands come in either spring or air-tensioned models. The same arrangement can be furnished with most Hammond polishing lathes.

This installation is said to work out exceptionally well in plants where abrasive belts can be used to advantage, but limited space makes it impractical to install the backstands in back of the polishing lathe. Hammond Machinery Builders, Inc., Dept. B, 1614 Douglas Ave., Kalamazoo, Mich.

Use ACTION Card, opposite page 64. Encircle No. 123

Micro bleeder valve

The Micro valve is said to be an entirely new bleeder type unit employing a direct and instantaneous piston action which makes possible micrometer limits of .001" for control of stroke or depth. Stroke and speed can be controlled in either direction.

The valve is claimed to be suitable for automatic or semi-automatic operation on



many machine tools such as in drilling, broaching, reaming and tapping operations, with controlled stroke. It is readily adaptable to old or new equipment. March Automatic Products Co., Dept. B, 1355 Spring St., Muskegon, Mich.

Use ACTION Card, opposite page 64, Encircle No. 124



Advertisements acceptable in THE MARKET PLACE include those for employment, sales services, production facilities, representation and related needs. Rates: \$15 per column inch per insertion. Maximum size advertisement accepted in this section is two inches.

Copy should reach us by the first of the month for next month's issue.

MACHINE and TOOL BLUE BOOK

A Hitchcock Publication

Wheaton, Ill.

IMPORTED PRECISION TOOLS

Vernier Calipers up to 80" - Height gages up to 48" at savings up to 40% to the user and excellent proposition for dealers.

RADIAL DRILLS & VERTICAL MILLS

Territories Open

We Carry the Tools in Stock

Box 245

c/o MACHINE and TOOL BLUE BOOK

Wheaton, Ill.



SURPLUS SALE **NEW TOOL POST** GRINDERS REGULAR PRICE \$125.00

\$39.50

Less Grinding wheel 1/6 H.P. MOTOR

Takes Wheels up to ½" x 4"
Extra Quill Ext. or Internal \$19.50 **Money Back Guarantee**

EDWARD J. NOLAN PULASKI, NEW YORK

DROP FORGINGS

To Your Specifications **Prompt Quotations**

BALDT ANCHOR CHAIN & FORGE DIVISION O. Box 350

Chester, Pennsylvania

MODERN MANUFACTURING **FACILITIES AVAILABLE** IN OUR MACHINED AIRCRAFT PARTS DEPT.

Monarch Air Tracer Lathe-20" & 14" (Shaft work up to 14x40. Contour turning 28" diameter.)

Monarch Keller Lathe-16"

Hendey & Monarch Engine Lathes Internal & External Grinders

Also modern drilling and milling equipment.

J. G. TILP, INC. **BOX 554** UNION, NEW JERSEY

Manufacturers' Representatives

Wanted for New England, Metropolitan New York, New Jersey, Georgia, Alabama and Fierida by well established manufacturer of air blow guns, mold spray guns and other air specialties sold direct to industrial users.

Rev 235

c/o MACHINE and TOOL BLUE BOOK

Wheatsn. III.



GEARED HEAD RADIAL DRILL PRESSES LOW COST VERTICAL MILLING MACHINES

Full Line of Vernier Calipers and Height Gages Splendid Opportunity for Dealers

Masters 3613 ARCHER

CHICAGO 9. ILL.



METAL PRODUCTION CAPACITY AVAILABLE

For long or short production runs of large or small parts, tools, jigs or fixtures. Also dies, gages, special machinery.

Keller Profilometer-Duplicator, 16" x 24".

Presses up to 450-Ton, 48" x 48", triple action.

Planers up to 20-foot stroke, 72" x 72". Radial Drill Presses up to 8-foot, 19" column.

Lathes up to 158" c.c, 571/2" gap, 40"

swing.
Boring Mills up to 120" bed, 90" horiz., 60" vert.

Also Milling Machines, Grinders etc. Complete production facilities—experienced machinists.

INQUIRIES INVITED ON CONTRACT BASIS OR INDIVIDUAL QUOTATION

& DIE CORPORATION

NORTH TONAWANDA, N. Y. Phone JA. 1200

SPECIALTY MACHINE WORK

High Precision Dividing, Both Linear and Circular on Dials, Scales, Verniers, etc.

Tracer Controlled Lathe Work. Stepped Shafts, Turned Contours, etc.

We invite your inquiries.

F. T. GRISWOLD MFG. CO.

Lancaster Avenue, Devon, Penna.
PHONE WAYNE 4080-4081

M. E. WANTED

Engineer familiar with design of machine tools and general metal production. Excellent opportunity. Include full details with first letter.

c/o MACHINE and TOOL BLUE BOOK Wheaton, III.



easy to see against the dark blue background. Speeds up layout work and cuts costs. Merely wipe surface clean and brush on layout fluid. Dries instantly. Write on your company letterhead for free sample. Advise us if your local supply house doesn't carry.

DAYTON ROGERS

Manufacturing Company

MINNEAPOLIS 7. MINNESOTA

MARKET PLACE—Continued



The world's best , , , one-piece, drop-forged—not welded—of mild earben steel, heat-treated, with head accurately milled for standard tables on lathes, planers, boring mills, milling machines, integral washer and nut. Sizes: up to 30". Typical direct prices for 10" lengths: "y=\$1.36; %—\$1.58; %—\$1.89. Write for price list.

THE O K TOOL COMPANY

Small, fully equipped machine shop desires new or existing product to manufacture. Fixed price or royalty basis. Very desirable location.

Write Bex 237 c/e BLUE BOOK WHEATON, ILL.

Now Simplified Instructions MACHINE TOOL RECONDITIONING

Write today for folder describing book

Machine Tool Publications

215 Commerce Bldg. East 4th St.

St. Paul 1, Minn.

DIAL INDICATORS REPAIRED 48 HOUR SERVICE

All makes of dial Indicators repaired within 48 hours after receipt of gages. Federal, Last Word, Starrett, Ideal, Ames, Standard, Gem, etc. All work fully guaranteed.

Plug Gages Also Reconditioned

INSPECTION DEVICES COMPANY
5636 S. Lake Park Ave. Chicago 37, III.
Fairfax 4-2883



INDUSTRIAL PRODUCTS WANTED

Well trained national sales organization, now calling on maintenance, tool room and production departments in industry can now handle additional lines. We call on well rated industrial firms. What do you have?

Box Number 241.

c/o MACHINE and TOOL BLUE BOOK

Wheaton, Ill.

SPECIALTY TOOL JOBBERS

Exclusive territory available by Manufacturer of standard fixture details. Attractive proposition.

Box 247 c/o MACHINE and TOOL BLUE BOOK Wheaton, III.

Erick Magna-Holder for indicators

The Magna-Holder features a magnetic base constructed with permanent Alnico

magnets, exerting 50 lb. pull. It can be mounted on all ferrous surfaces, curved or flat. Thumb screw locks indicator travel slide after indicator is positioned. When not needed detachable extension bracket can be removed and indicator mounted there. Shoulder screw attachment permits extension bracket to be moved through 180 degree are without loosening or tightening any screw or nut.

Dimensions of the base are: 3½" long x 1" high x 1" wide. Available from Cullen Mfg. Co., Dept. BB, 1318 Clark St., Racine, Wis.

Use ACTION Card, opposite page 64. Engirele No. 142

Mechanics Through The Ages





Versatile . . . that's the name for the Cri-Dan "B" high-speed precision threader.

Illustrated are 10 completely different parts—all of which were threaded on the Cri-Dan "B" at the Carmichael Machine Co. of Springfield, Ohio.

When it comes to high-speed precision threading the Cri-Dan "B" has no equal.

Key to the Cri-Dan's unexcelled speed and accuracy is the single carbide-point tool. Changeover is fast and tool cost is low.

Before you buy any threading machine be sure you get the facts on Cri-Dan "B". It has established new threading standards for speed, accuracy and versatility.

Write to Lees-Bradner for the whole story and the name of our representative in your city.

CLEVELAND 11, OHID, U.S.A. COMPANY



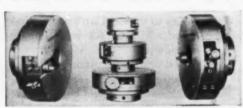
T. H. LEWTHWAITE MACHINE CO., INC.

Because we specialize in PUNCHES and DIES, you can effect savings in time and money on your punch and die requirements by taking advantage of our large stock of these tools, which fit most makes of hand, foot, and power operated presses.

SEND FOR CATALOG SHEETS ON OUR COMPLETE LINE

312 E. 47th St., N.Y.C.





MUMMERT-DIXON FACING HEADS

with Automatic Feed

One-way Tool Feed — 6, 9 and 12" sizes.

Two-way Tool Feed — 9, 12, 16, 20, 24, 30, 36, 40 and 46" sizes. Save many costly set-ups. Bulletin No. 4141 Gives Full Details

MUMMERT-DIXON CO., 122 Philadelphia St., Hanover, Pa.



SQUAR-UP

COMBINATION ANGLE PLATE AND PREGISION VISE WITH TWO INFINITELY POSITIONABLE JAWS. GIVING YOU GREATER UTILITY AT LESS COST, IN TOOL ROOM, PRODUCTION SHOP AND INSPECTION DEPT.

WRITE FOR FREE CIRCULAR

KEARSARGE TOOL & MANUFACTURING COMPANY, R.D. NO. 3, ERIE, PA.

Whatever You Need, You'll Find It Here

A

Abrasive Belt Machines, 3, 71, 330
Abrasive Cloth, Paper, Disc, Belts, Wheels,
Stones, Etc., 28, 29, 76, 90, 127, 192-a,
192-b
Abrasive Cutting Machines, 60
Accumulators, 397
Adapters, 57, 87
Alar Control Equipment, 79, 93
Air Operated Equipment, 233, 307, 363, 370
Air Tools, 72, 342
Alloys, 152, 247
Angle Blocks, 237
Arbor Spacers, Shim Stock, 412
Arbors, 87
Attachments, Machine Tool, 115

B

Backrests, Roller, 23 Balancing Machines, 58, 173, 267 Bars, 22, 152 Bearings, Ball, 107 Bending Equipment, 44, 101, 118, 150, 192-d, 247, 250, 295, 317 Blanks, Circular Form Tool, 296 Blow Guns, 93, 304, 370 Boring Bars and Tools, 75, 123 Boring Chucks, 232, 263 Boring, Drilling & Milling Machines, 6 Boring, Drilling & Tapping Machines, 27 Boring, Facing Machines, 299 Boring, Facing Tools, 75, 309, 339 Boring Heads, 75 Boring Machines, 11 Boring Tools, 75, 294, 341 Brakes, Hand, 150 Brakes, Press and Bending, 39, 64, 144, 374 Broach Sharpeners, 345 Broaches, 10, 206, 270, 329, 345 Broaching Attachments, 10, 345 Broaching Machines, 10, 206 Burring Machines and Tools, 372 Bushings, 37, 55, 57, 376 Bushings, Drill Jig. 251, 314 Bushings, Retary, 258

C

Calipers, 352
Oams, 305, 315, 352
Carbide Stock, 214, 244
Carbide Tools, 4, 23, 99, 214, 244, 255, 304, 349, 377

Center Measuring, 257 Centers, Bench, 230, 251 Centers, Live, 202, 218, 246, 272, 304, 340, 373 Chamfering Machinery, 44 Chip Breakers, Drill, 370 Chucking and Indexing Fixtures, 275 Chucks, 45, 80, 123, 283, 298 Chucks, Drill, 87, 185 Chucks, Lathe, 80 Chucks, Magnetic, 80, 365 Chucks, Safety, 47 Clamps, Hook, 344 Clamps, Jaw, 42 Clamps, Toggle, 285, 344 Clutches, 330, 340, 415 Coatings, 121 Coil Cradles, 73 Cold Roll Forming Machines, 122 Cold Treating Equipment, 70 Collets, 87, 192-a. 340 Comparators, Dial, 50, 96 Coolants, 239 Counterbores, 99 Countersinks, 99, 372 Couplings, 330 Crimpers, Pipe, 368 Cut-off machines, 354 Cut-off wheels, 60, 354 Cutter Grinder Fixture, 114 Cutters, 4 Cutting Fluid and Oils, 53, 347 Cutting Machines, 60 Cutting Tools, 18, 19, 55, 377 Cutting Wheels, 119 Cylinders, Hydraulic and Pneumatic, 79, 88, 89, 93, 165, 260

D

Deburring Machines and Tools, 32, 44, 288, 372
Demagnetizers, 80
Dial Indicators, 2, 261
Diamond Wheels, 76
Die Casting Machines, 112, 113
Die Heads, 48
Die Making Machines, 30, 223
Die Making Machines, 36, 223
Die Sets, 59, 51, 140, 370
Dies, 223, 241
Dividing Heads, 80
Dowel Pins, 251, 268
Down Holding Devices, 42
Draw Bars, 340

X

Dressing Fixtures, Grinding Wheel, Back Cover Drill Chip Breakers, 370 Drill Heads, 78, 169, 259, 349, 370 Drill Heads, Multiple Spindle, 349, 370 Drilling and Tapping Units, 349, 370 Drilling Attachments, 370 Drilling Attachments, Multiple Spindles, 271, 304 Drilling Machines, 67, 101, 233, 310, 311 Drilling Machines, Bench, 159, 252 Drilling Machines, Multiple Spindle, 138, 148 Drilling Machines, Precision, 159 Drilling Machines, Radial, 52, 130, 349 Drilling Machines, Sensitive, 159 Drilling Machines, Upright, 130, 138, 148 Drills, 18, 19, 26, 99, 345 Drills, Hard Steel, 269 Drills, Spade, 235 Drills, Twist, 18, 19 Drivers, Tool, 263 Drives, Hydraulic, 86 Dust Controls, 21, 305, 321

E

End Mills, 18, 19, 26, 31 Engravers, 361, 399

.

Fabricating Tools, 66 Facing Heads, 412 Feeds, Automatic Bar, 248 Feeds, Roll, 73 Feeds, Ribbon, 217 Feeds, Slide, 73 Feeders, Work, 84, 217, 266 Feeding Devices, 84 Files, 83 Files, Rotary, 372 Filing Machines, 30 Filters, 87 Finishing Machines, 44 Fixture Parts and Fittings, 363 Fixtures, Machine Tool, 45 Flat Stock, Ground, 243 Flexible Shaft Equipment, 204 Flexible Shaft Machines, 203 Floats, 303 Flux, 331 Furnaces, Heat Treating, 100, 325

G

Gage Accessories, 336 Gage Blocks, 110 Gage Stocks, 330 Gages, 96, 110, 251, 261, 292, 337 Gages, Cylindrical, 292 Gages, Dial, 96 Gages, Height, 367 Gages, Internal, 171, 294 Gages, Jaw, 96 Gages, Plug, 57, 332 Gages, Ring, 57, 292 Gages, Thread, 171, 346 Gang Slitters, 122 Gear Hobbing Machines, 161, 174, 175 Gears, 69 Grinders, 30, 55, 104, 105 Grinders, Abrasive Belt, 3 Grinders, Air, Portable, 307 Grinders, Bench, 57, 316 Grinders, Center, 8, 9 Grinders, Carbide Tool, 3, 316 Grinders, Centerless, 8, 9, 201 Grinders, Chaser, Cut-off Wheel, 354 Grinders, Contour, 138 Grinders, Cylindrical, 142 Grinders, Drill, 30, 169, 240 Grinders, Face, 90 Grinders, Face Mill, 30 Grinders, Flexible Shaft, 169 Grinders, Floor, 57 Grinders, Hacksaw, 338 Grinders, Keyseating, 138 Grinders, Knife, 90 Grinders, Pedestal, 316 Grinders, Portable, 169 Grinders, Precision, 12, 13 Grinders, Surface, 90, 97, 103, 242 Grinders, Template Tool, 30 Grinders, Tool & Cutter, 30, 67, 90, 240, 293 Grinders, Tool Post, 169 Grinding, Boring, Milling & Drilling Attachments, 379 Grinding Wheels, 26, 28, 29, 76, 97, 104, 105, 192-b, 192-c, 201 Guards, Press, 249 Guns, Air, 165

н

Hammers, Rawhide, 74 Hand Knobs, 348 Hand Wheels, 237 Handles, Portable Drill, 356 Handles, Machine, 237 Hardness Testing Equipment, 215, 241, 328, Hinges, 292, 376 Hob Sharpeners, 174, 175 Hobbing Machines, 174, 175 Hobs, 174, 175 Hoists, 298 Hoists, Air, 342 Hoist Hooks, 219 Holders, Back Rest, 23 Holders, Cut-off Blade, 23 Holders, Floating Drill, 23 Holders, Tap & Die, 23 Holders, Tool, 20, 28, 75 Holders, Turret Backrest, 23 Honing Machines, 7 Hopper Feeding Units, 343 Hose Assemblies, 87

.

Index Fixtures and Tools, 343

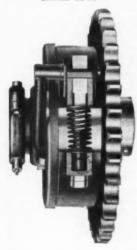
Hydraulic Equipment, 397

for hard going in or out of weather

CONWAY

"The Clutch of Robust Refinement"

SERIES 36-A





Power Transmission Instantly
When and Where Desired with This

CONWAY COMPRESSION CLUTCH

Powerful based type with sprocket mounting. Simple units...rugged construction...robust capacity...easily adjusted. Also made for brakes.

There's a Conway Clutch for every type of industry

STANDARDIZED, INTERCHANGEABLE PARTS
PRECISION-BUILT OF BASIC MATERIALS

WRITE FOR NEW BULLETINS

THE CONWAY CLUTCH CO.

1105 MARSHALL ST.

CINCINNATI 25, OHIO

Jig Borers, 306
Jig Boring Services, 253, 352
Jig Feet, Double End and Screw Type, 352
Jig Feet, Screw and Press Type, 352
Jigs and Fixtures, 300
Jo-Blocks, 125

K

Keyseaters, 305 Knobs, Machine, 237, 352 Knurling Tools, 23, 116, 117

ı

Lapping Machines, 194, 105
Lapping Tools, 336
Lathes, Drives, 88
Lathes, Automatic, 58, 173
Lathes, Bench, 67
Lathes, Engine & Toolroom, 132, 133, 191, 208
Lathes, Floor, 67
Lathes, Gap, 132, 133
Lathes, General Purpose, 132, 133
Lathes, Precision, 276, 327
Lathes, Threading, 324
Lathes, Tool, Gage-Makers, 327
Lathes, Tool, Gage-Makers, 327
Lathes, Turret, 58, 67, 77, 173, 195, 333
Layout Materials, 396, 314, 367
Lighting Equipment, 220
Light Wave Equipment, 110
Lubricants, 14, 53
Lubricators, 165, 342

M

Magazine Attachment, 68 Magnifiers, 46, 397 Mallets, Plastic, 41 Mandrel, 45 Marking Equipment, 102, 192, 273, 358 Metallizing, 63 Micrometers, 16, 17, 96, 216, 318 Micrometers, Center, 257 Micrometers, Pedestal, 337 Milling Cutters, 49, 123, 394 Milling Heads, 212, 309 Milling Machine Attachments, 62, 294 Milling Machines, 1, 11, 51, 54, 82 Milling Machines, Bench, 392
Milling Machines, Hand, 91
Milling Machines, Horizontal, 108
Milling Machines, Thread, 33 Milling Machines, Turret, 15, 62
Milling Machines, Vertical, 1, 15, 108 Milling Planers, 11 Mills, 309 Mills, Slab, 265 Motors, Electric, 169, 387 Motors, Gear Head, 169 Mounted Wheels, 28, 29, 334 Multi-Operation Machines, 27, 73, 123 Multiple Spindle, Drilling Equipment, 259

N

Name-Plate Stamping Machines, 172 Nibbling Machines, 72, 363 Notching Equipment, 350 Nuts, 352 Nuts, Flanged, 352

0

Oil, Anti-Weld, 49 Oil Groovers, 320, 378 Oilers, 73 Optical Inspection Devices, 328

P

Pantographs, 147 Parallels, 237 Parallels, Box, 237 Parallels, Magnetic Chuck, 172 Pins, Taper, 337 Pipe Tongs, 219 Planers, 11 Planers, Milling Type, 11 Plastic Coating, 121 Portable Air Tools, 73
Portable Electric Tools, 35, 302 Power Units, Air-Hydraulic, 79 Precision Instruments, 110 Press Brakes, 144, 197 Presses, Air, 233, 260 Presses, Arbor, 233 Presses, Bench, 343 Presses, Blanking, 144 Presses, Drawing, 144 Presses, Flywheel, 238 Presses, Foot, 233 Presses, Forming, 144 Presses, Hydraulic, 61, 314, 397 Presses, O. B. I., 238 Presses. Power, 66, 233, 238 Presses. Punch, 36, 61, 106, 144, 238, 292, 343 Presses, Turret Punch, 106 Pressure Blasting, 308 Pressure Handle, 356 Pumps, Coolant & Lubricant, 126, 256, 265, 291 Pumps, Hand, 397 Pumps, Industrial, 256 Punch Press Sets. Punch, Shear, Notchers, 24, 25 Punches, 101, 250, 357, 363 Punches and Dies, 34, 412 Pyrometers, 370

0

Quick Change Tools, 20, 128 Quills, 169

D

Racks, 330 Racks, Bar Stock, 351 Radial Relief Grinders, Back cover

S

Safety Devices, 249 Saw Blades, Band, 243, 351, 353 Saw Blades, Hack, Inside front cover, 243, 290, 353, 364 Sawing Machines, Band, 98, 233, 314 Sawing Machines, Friction, 250 Sawing Machines, Hack, Inside front cover, 36 80 Sawing Machines, Portable Band, 35 Saws, Circular, 48 Saws, Hole, 243 Scrap Cutters, 73 Scrapers, Hand, 284 Screw Drivers, Power, 84, 111 Screw Machine Attachments, 378 Screw Machines, Automatic, 112, 113 Screw Sets, 352 Screw Sets, Transfer, 352 Screws, Cap. Set, Socket & Machine, 352, 375 Services: Milling, Grinding, Lapping, Rebuilding, Repairing, Business, etc., 122, 124, 206, 223, 251, 315, 322, 329, 352 Shapers, 38, 39 Shapers, Bench, 36, 67 Shearing Machines, 38, 39, 101, 289, 233, 326 Shears, Punch, Coper, 250 Sheet Metal Machinery, 24, 25 Shims, 322 Shim Stock, 275 Shop Tools, 219 Sine Bars, 42 Sine Blocks, 254 Sine Plates, 312, 319 Sleeves, Square Hole, 329 Slides, 73 Slitting Cutters, 49 Slotters, 49 Special Machinery, 58, 173, 300, 313, 343 Special Tools, 99, 418, 419 Spherical Washers, 352 Spindles, 55, 120, 2 Spring Winders, 399 210, 378 Square Hole Drills, 352 Staking Machines, 286 Stamps, Steel, 102, 273, 358 Steel and Steel Stock, 22, 95, 152, 347, 375 Inside back cover Step Blocks, 352 Step Block Sets, 352 Stock Reels, 73 Stops, 73, 222 Stops, Drill, 330 Stops, Revolving, 23 Straighteners, 73, 249

Structurals, 152 Stud Sets, 352 Stud Setters, 85 Sub-Presses, 275 Superfinishers, 58, 173 Surface Finish Indicators, 92 Surface Finish Standards, 251 Surface Pinish Standards, 251 Surface Pinish, 237, 287, 292, 323, 352, 369

1

Tables, Elevating, 40, 163, 282, 369 Tables, Rotary & Index, 274, 369 Tap and Drilling Units, Reverse, 349 Tap Heads, 349, 370 Tappers, 346, 349, 370, 371, 423 Tappers, Automatic Reverse, 349 Tapping Attachments, 87, 349, 362, 370, 371 Tapping Heads, 47, 349, 371 Tapping Machines, 138, 142, 148, 348 Tapes, 216 Taps, 16, 17, 18, 19, 26, 65, 264, 337, 380, 418, 419 Tap Cases, Plastic, 65 T-Bolts, 369 Thinners, Drill Point, 30 Thread Gages, 16, 17 Thread Rolling Machines, 116, 117, 142 Threading Machines, 94, 324, 349, 411 Threading Tools, 116, 117 T-Nut and Stud Sets, 352 Tool Bits, 99 Tool Holders, 4, 128 Tool Posts, 23, 123 Transfer Machines, 78 Transfer Screw Sets, 294 Traps, Steam and Air, 303 Tubing, 152 Turning Tools, 23 Turrets, Lathe, 67

U

Universal Joints, 221

٧

V-Blocks, 172 Valves, 79, 93, 186, 303, 370 Vises, Bench and Machine, 42, 56, 59, 80, 87, 275, 306, 330, 351, 352, 363, 367, 412 Vises, Safety, 224 Vises, Toolmakers, 352, 412 D

w

Washers, 322
Way Lubricant, 14
Welding Equipment & Supplies, 109
Wheel Dressers, 42, 263, Back cover
Wrenches, 219
Wrenches, Automatic, 313
Wrenches, Impact, 111
Wrenches, Production, 202
Wrenches, Socket, 219



WHY WAIT FOR SPECIAL DRILLS?

Has them IN STOCK for IMMEDIATE DELIVERY!

Extra Long Length High Speed Drills—Straight Shank

TAPER LENGTH WIRE GAUGE SIZES

| Wire Gause Nos. | Price Each | Length Overall Inches | Approx. Length of Twist Inches | Wire Gauge Nos. | Price Each | Length Overall Inches | Approx. Length of Twist Inches |
|-----------------------|------------------------|------------------------------|---|-----------------------|--------------------------|-----------------------------------|---|
| 1 2 3 4 | \$1.00 1.00 1.00 | 61/s 61/s 6 | 33/4 33/4 35/8 35/8 | 31 32 33 34 | .70 .70 .70 .70 | 51/a 51/a 51/a 51/a | 3 3 3 |
| 5 6 7 8 | 1.00 1.00 1.00 | 6 6 6 | 35/s 35/s 35/s 35/s | 35 36 37 38 | .70 .70 .70 .70 | 51/a 45/a 45/a 45/a | 3 2½ 2½ 2½ 2½ |
| 9 10 11 12 | 1.00 1.00 .90 | | 35/6 35/8 35/8 35/8 | 39 40 41 42 | .70 .70 .60 | 4 % 4 % 4 % 4 % 4 1/4 | 21/2 21/2 21/2 21/4 |
| 13 14 15 16 | .90 .90 .90 | 53/4 53/4 53/4 53/4 | 3½ 3½ 3½ 3½ 3½ | 43 44 45 46 | .60 .60 .60 | 41/4 41/4 41/4 | 21/4 21/4 21/4 21/4 |
| 17 18 19 20 | .90 .90 .90 | 53/4 53/4 53/4 53/4 | 3½ 3½ 3½ 3½ 3½ | 47 48 49 50 | .60 .60 .60 | 41/4 32/4 33/4 33/4 | 21/4 2 2 2 |
| 21 22 23 24 | .80 .80 .80 | 53/4 53/4 | 3½ 3½ 3¼ 3¼ 3¼ | 51 52 53 54 | .50 .50 .50 | 33/4 33/4 3 3 | 2 2 1 3/4 1 3/4 |
| 25 26 27 28 | .80 .80 .80 | 53/8 53/6 53/6 53/6 | 31/4 31/4 31/4 31/4 | 55 56 57 58 | .50 .50 .50 | 3 21/4 21/4 21/4 | 1 3/4 1 1/6 1 1/6 |
| 29 30 | .80 | 53/8 | 31/4 | 59 60 | .50 | 21/4 | 1 1/a 1 1/a |

STRAIGHT SHANK 12" LONG 9" FLUTE

| Size Inches | Price Each Net | Size Inches | Price Each Net |
|----------------|----------------------|----------------|----------------------|
| 1/8 . | \$1.65 | 5/16 | 2.25 |
| 9/64 . | 1.65 | 21/64 | 2.50 |
| 5/32 . | 1.65 | 11/32 | 2.50 |
| 11/64 . | 1.65 | 23/64 | |
| 3/16 . | 1.65 | 3/8 | . 2.75 |
| 13/64 . | 1.80 | 25/64 | . 3.05 |
| 7/32 | 1.80 | 13/32 | 3.05 |
| 15/64 . | 1.95 | 27/64 | . 3.30 |
| 1/4 . | 1.95 | 7/16 | . 3.30 |
| 17/64 . | 2.05 | 29/64 | 3.60 |
| 9/32 . | 2.05 | 15/32 | 3.60 |
| 19/64 . | 2.25 | 31/64 | 3.60 |
| | | 1/2 | 3.60 |

15" LONG 12" FLUTE

| 17/32 | \$7.00 7.70 8.25 | 21/32 | | 9.00 |
|-------|------------------------|-------|-------|------|
| 9/16 | 7.70 | 11/16 | ***** | 9.10 |
| 10/22 | 9.25 | 22/22 | ***** | 0.35 |
| 6/0 | 0.23 | 23/32 | **** | 7.33 |

Taper Length Letter Sizes

| Size | Price Each | Length Overall Inches | Approx. Length of Twist Inches |
|------------|---------------|-----------------------------|---|
| A-E F-K | \$1.64 | 61/8 | 4 |
| L-N O-R | 1.78 | 63/8 | 41/a |
| S-U V-Y | 2.00 | 63/4 | 43/4 |
| Z | 2.29 | 71/4 | 45/8 |

TAPER SHANK

TAPER SHANK

| Size | Price Each | Length | Twist Inches | Shank Size | Size | Price Each | Length Inches | Twist Inches | Shank Size |
|-------|---------------|--------|-----------------|---------------|--------|---------------|------------------|-----------------|---------------|
| 33/64 | \$7.15 | 17 | 13 | No. 2 M.T. | 47/64 | \$ 9.50 | 17 | 13 | No. 2 M.T. |
| 17/32 | | 17 | 13 | No. 2 M.T. | 3/4 | 9.50 | 17 | 13 | No. 2 M.T. |
| 35/64 | 7.70 | 17 | 13 | No. 2 M.T. | 25/32 | 10.20 | 17 | 13 | No. 2 M.T. |
| 9/16 | 7.70 | 17 | 13 | No. 2 M.T. | 13/16 | 12.00 | 18 | 133/8 | No. 3 M.T. |
| 37/64 | 8.25 | 17 | 13 | No. 2 M.T. | 27/32 | 12.50 | 18 | 133/4 | No. 3 M.T. |
| 19/32 | 8.25 | 17 | 13 | No. 2 M.T. | 7/8 | 13.20 | 18 | 133/8 | No. 3 M.T. |
| 39/64 | 8.80 | 17 | 13 | No. 2 M.T. | 29/32 | 13.75 | 18 | 133/8 | No. 3 M.T. |
| 5/8 | 8.80 | 17 | 13 | No. 2 M.T. | 15/16 | 14.30 | 18 | 133/8 | No. 3 M.T. |
| 41/64 | 9.00 | 17 | 13 | No. 2 M.T. | 31/32 | 15.40 | 18 | 133/6 | No. 3 M.T. |
| 21/32 | | 17 | 13 | No. 2 M.T. | 1 | 17.60 | 201/2 | 157/8 | No. 3 M.T. |
| 43/64 | 9.10 | 17 | 13 | No. 2 M.T. | 1-1/16 | 18.70 | 201/2 | 157/a | No. 3 M.T. |
| 11/16 | | 17 | 13 | No. 2 M.T. | 1-1/8 | 19.80 | 211/2 | 157/8 | No. 4 M.T. |
| 45/64 | | 17 | 13 | No. 2 M.T. | 1-3/16 | | 211/2 | 157/a | No. 4 M.T. |
| 23/32 | | 17 | 13 | No. 2 M.T. | 1-1/4 | 24.00 | 211/2 | 157/4 | No. 4 M.T. |





WHY WAIT FOR SPECIAL TAPS?

Has them IN STOCK for IMMEDIATE DELIVERY!

HIGH SPEED

SPECIAL

RIGHT HAND TAPS

| SIZE | THREAD | SIZE | THREAD | SIZE | THREAD |
|-------|-----------------------|---------|---------------------------------|---------|----------------|
| 4 | 32-48-60-64 | 3/8 | 12-16-18-20-27-28-32-36-40-48 | 1-3/4 | 8-10-12-14- |
| 5 | 30-32-36-48-80 | 7/16 | 12-16-18-22-24-27-28-30-32-36- | | 16-18-20-24 |
| 6 | 36-40-48-56-60 | | 40 | 1-13/16 | |
| 7 | 32-40 | 1/2 | 12-14-16-18-22-24-26-27-28-38- | | 16-18-20 |
| 8 | 24-30-36-38- | | 32-40 | 1-7/8 | 8-10-12-14- |
| | 40-44-48 | 9/16 | 16-20-24-27-28-30-32-48-48 | | 16-18-20-24 |
| 9 | 24-28-32-40 | 5/8 | 12-14-16-20-24-27-28-32-36-40 | 1-15/16 | 8-10-12-14- |
| 10 | 28-30-36-40- 48-64 | 11/16 | 11-16-18-20-24-27-28-30-32 | | 16-18-20-24-28 |
| 12 | 20-28-32-36 | 3/4 | 9-11-12-14-18-20-24-26-27-28-32 | 2 | 4-1/2-8-10- |
| 14 | 20-24-28 | 13/16 | 10-14-18-20-32 | 4 1/10 | 12-16-18-20 |
| 1/16 | 60-64 | 7/8 | 10-12-16-18-20-24-27-28-32 | 2-1/16 | 12-14 |
| 5/64 | 72 | 15/16 | 8-9-10-12 4-16-18-20-24-32 | 2-1/8 | 12-16-20 |
| 3/32 | 48 | 1 | 10-12-16-18-20-24-27-32-40 | 2-1/4 | 4-1/2-8-12- |
| 7/64 | 48-56 | 1-1/16 | 12-14-16-18-20-24 | , . | 14-16-18 |
| 1/8 | 32-40 | 1-1/8 | 8-10-14-16-18-20-24-32 | 2-5/16 | 12-18 |
| 5/32 | 32-36-40 | 1-3/16 | 8-10-12-14-16-18-20-24 | 2-3/8 | 12-16-18 |
| 9/64 | 36-40 | 1-1/4 | 8-10-14-16-18-20-24-32 | 2-1/2 | 8-10-12 |
| 11/64 | 36 | 1-5/16 | 12-14-16-18-20-24-32 | 2-9/16 | 18 |
| 3/16 | 20-24-32 | 1-3/8 | 8-10-14-16-18-20-24 | 2-5/8 | 12-16-20 |
| 13/64 | 32 | 1-7/16 | 8-10-12-16-18-20-24 | 2-7/8 | 8-12-16 |
| 7/32 | 24-28-32 | 1-1/2 | 8-10-14-16-18-20-24-28 | 3 | 8-16 |
| 1/4 | 18-24-26-27- | 1-9/16 | 18-20-24 | 3-1/4 | 8-12-16 |
| | 30-32-36-49 | | | 3-1/2 | 8-12-16 |
| 5/16 | 16-20-22-27- | 1-5/8 | 51/2-8-10-12-13-16-18-20-24 | 3-7/8 | 6 |
| | 28-32-40 | 1-11/16 | 10-12-14-16-18-20-24 | 4 | 8-12 |

HIGH SPEED LEFT HAND TAPS

| SIZE | THREAD | SIZE | THREAD | SIZE | THREAD |
|--|--|--|--|--|---|
| 0 1 2 3 4 5 6 8 8 10 12 1/4 5/16 | 80 56-64 56-64 56-32-36-40-48 40-44 32-36-40 32-36-40 24-30-32-40 24-26-32 21-28-32 18-20-24-28-32 | 3/8 7/16 1/2 9/16 5/8 11/16 3/4 13/16 7/8 1 | 16-24-32 14-20-28 12-13-20-28 12-18-20-24 11-12-18-20-24 11-16-24 10-16-18-20 18-12-14-16-18-20 8-12-14-16-18-20 7-12 | 1-3/8 1-7/16 1-1/2 1-9/16 1-5/8 1-11/16 1-3/4 1-13/16 1-7/8 1-15/16 | 6-8-10-12-16-18-20-24 8-10-12-14-16-18-20 6-8-10-12-16-18-20 8-10-12-16-18-20 8-10-12-16-18-20 8-10-12-14-16-18-20 8-10-12-14-16-18-20 8-10-12-14-16-18-20 8-10-12-14-16-18-20 8-10-12-14-16-18-20 8-10-12-14-16-18-20 8-10-12-14-16-18-20 |

. SPECIAL AND LEFT HAND DIES IN STOCK

NOTE: Oversize, Undersize, Metric, 64th and 32nd Size Taps Available for Quick Delivery. We stock Special Sizes in High Speed Milling Cutters, Slitting Saws, End Mills and Reamers.

DEALER INQUIRIES INVITED

SID TOOL COMPANY, INC.

CUTTING TOOL SPECIALISTS
128 LAFAYETTE STREET - NEW YORK 13, N. Y.

 Are you on our monthly mailing list? Write Dept. B

Index to Advertisers

A

| Abrasive Machine Tool Company 90 |
|--|
| Accurate Bushing Company 37 |
| Ace Drill Bushing Company |
| Acme Broach Corporation 16 |
| Acme Danneman Company, Inc |
| Acme Industrial Company |
| Acme Tool Company |
| Acromark Company |
| Aget-Detroit Company305-321 |
| Air-Mite260 |
| Air Transport Equipment, Incorporated |
| Air-Way Pump and Equipment Company37 |
| Air-way Pump and Equipment Company |
| Alco Tool Company |
| Alina Corporation31 |
| Allen, Alva F295 |
| Allison Company11 |
| American Air Filter Company 2 |
| American Broach and Machine Co200 |
| American Chain and Cable Co. (Wilson Mechanical Instrument Div.) |
| (Wilson Mechanical Instrument Div.)24 |
| American Machine and Foundry Company (Wahlstrom Float-Lock Division) |
| (Wahlstrom Float-Lock Division)22 |
| American Pine Bending Machine Company29: |
| American Saw & Mfg. Company |
| American Standard Company |
| American Standard Perforators |
| Ames Company, B. C 90 |
| Anderson Bros. Manufacturing Company28 |
| Armstrong-Blum Mfg. Co Inside front cove |
| Assessment Prothers Tool Company |
| Aro Equipment Corp34 |
| Atlantic Saw Manufacturing Co |
| Automatic Methods |
| Auto Moulding and Manufacturing Company 29 |
| Avey Drilling Machine Company |
| Avey Drining Machine Company |
| |

B

| Daker and Comban's |
|---------------------------------------|
| Baker Brothers, Incorporated |
| Bald Eagle Tool Company31 |
| Baldor Electric Company |
| Baldt Anchor Chain & Forge Division40 |
| Bansbach Machinery Company |
| Barber-Colman Company |
| Barnes Company, W. O |
| Bartelt Engineering Works |
| Rath and Company, John |
| Bausch and Lomb Optical Company 4 |
| Rear Manufacturing Company |
| Reaver Tool and Engineering Corp 2 |
| Besly-Welles Corporation 2 |
| Reverly Shear Manufacturing Company28 |
| Billings and Spencer Company |
| Rlack Drill Company |
| |
| Blanchard Machine Company 9 |
| Blanchard Machine Company |

| Bliss Company, E. W 6 | 1 |
|--------------------------------------|---|
| Bloomfield Tool Corporation | 2 |
| Boyar Schultz Corporation33 | ã |
| Brady Corporation25 | ă |
| Branch Manufacturing Company | 0 |
| Branch Manufacturing Company | z |
| Bridgeport Machines, Incorporated 6 | 2 |
| Brown & Sharpe Manufacturing Company | 5 |
| Brown Engineering Company | a |
| Brush Electronics Company 9 | 2 |
| Bryant Chucking Grinder Company | 7 |
| Buckeye Tools Corporation 7 | ģ |
| Buffalo Forge Company | ä |
| Dultan Porge Company | L |
| Bultool Company21 | 8 |
| Busch Company, J. C | 2 |

c

| Carborundum Company, The | r |
|--|----|
| Carlton Machine Tool Company 5 | ä |
| Cerro-de-Pasco Corporation24 | â |
| Chandler Tool Company | ė |
| Chicago Hawhide Manufacturing Company 7 | 2 |
| Chicago Wheel & Manufacturing Company33 | ì |
| Cimcool Division | 7 |
| (Cincinnati Milling Machine Company)23 | e |
| Cincinnati Rickford Tool Company | d |
| Cincinnati Gilbert Machine Tool Company Cincinnati Grinders, Inc | ì |
| Cincinnati Grinders Inc. 9. | ě |
| Cincinnati Milling Products Division | |
| (Cincinnati Milling Machine Company)20 | it |
| Cincinnati Shaper Company38-3 | á |
| Cincinnati Sub-Zero Products Company 7 | å |
| | |
| Clemann Renthers Incorporated 00 | å |
| Clemson Brothers, Incorporated 29 Cleveland Automatic Machine Company 112-11 | ٦ |
| Cleveland Crane & Engineering Company14 | á |
| Cleveland Instrument Company | 1 |
| Cleveland Punch and Shear Works Company 6 | |
| Cleveland Tapping Machine Company | ı |
| Columbus Die-Tool and Machine Company37 | 3 |
| Comet Tool Company29 | ŝ |
| Commander Manufacturing Company | |
| Comtor Company 5 | |
| Conant Broach Company34 | 1 |
| Consentele Tool Corporation | 9 |
| Concentric Tool Corporation | å |
| Continental Machine Contin | ş |
| Continental Machine Company | H |
| (Division Ex-Cell-O Corporation) | |
| Common Clutch Common Corporation) | |
| Conway Clutch Company41 | å |
| Cooley Electric Manufacturing Corporation 10 | Ą |
| Coulter Machine Company, James 9 | H |
| Criterion Machine Works 7 | 1 |
| Cro-Plate Company30 | d |
| Curtis Universal Joint Co | ė |

| D | н |
|--|--|
| Danneman Die Set Div. (Acme Danneman Co.) 370 Danly Machine Specialties, Incorporated 81 Dayton Rogers Manufacturing Company 408 Dearborn Company, J. W. 275 Deltronic Corporation 332 Detroit Die Set Corporation 140 Detroit Power Screwdriver Company 275-285-412 Detroit Tourer Screwdriver Company 275-285-412 Detroit Tap and Tool Co. 264 Dickerman Manufacturing Company H. E. 217 DoAll Company 347-349-351 Donovan Manufacturing Company 374 Dunovan Manufacturing Company 374 Dunovan Manufacturing Company 374 Dumore Company 169 Durant Tool Supply Company 299 Dykem Company 367 | Hamilton Tool Company 159-161-163 Hammond Machinery Builders 3 Hanson-Whitney Company 33 Hartmann Manufacturing Company 351 Heimann Manufacturing Company 294 Heinrich Tools, Incorporated 303 Heiler Brothers Company 83 Heiler Brothers Company 384 Heiler Brothers Company 385 High Speed Hammer Co. 286 High Speed Hammer Co. 286 High Speed Hammer Co. 387 Hogsson and Pettis Manufacturing Company 382 Hosesson and Pettis Manufacturing Company 385 Holiiday and Company, Incorporated, Carl 327 Holiiday and Company, Incorporated, Carl 327 Hosesson and Pettis Manufacturing Company 385 Holliday and Company, Incorporated, Carl 327 Houston Gomes Compony 317 Houston Gomes Company 317 Houston Grinding & Mfg. Company 317 Houston Grinding & Mfg. Company 317 Houston Grinding & Mfg. Company 328 Howald Machine Works, W. T 304 Howald Machine Products, Incorporated 330 |
| E | 1 |
| Eastern Machine Screw Corp. 48 Eastern Tool & Supply Company 345 Economy Engineering Company 40 Economy Tool and Machine Company 57 Elister Engineering Company, Incorporated 315 Elox Corporation of Michigan 223 Engelberg-Huller Company, Incorporated 71 Exhibition Hall 422 Ex-Cell-O Corporation 422 | Index Machine Company 108 Industrial Products Suppliers 409 Inspection Devices Co. 409 |
| (Continental Tool Works Div.) 55 | |
| | J & S Tool Company, Incorporated 42 Jahn Manufacturing Company, B. 258 Jones & Lamson Machine Company 195 |
| F | |
| Fairfield Gauge Company 367 Famco Machine Company 233 Farmington Engineering Co. 292 Federal Products Corporation 2 Fen Machine Company 313 Field and Son, Incorporated, Walter W. 294 Fischer Machine Company 320 Forney's, Inc. 299 Fostoria Pressed Steel Corporation 220 Fuilfo Specialties Company, Incorporated 126 Fulmer Company, C. Allen 7 | Kalamazoo Tank and Silo Company (Machine Tool Division) 248 Kasson Die & Motor Corporation 340 Kearney and Trecker Corporation 51 Kearneyse Tool and Manufacturing Company 441 Kennametal, Inc. 377 King, Andrew 377 Kilng Brothers Engineering Works 256 Knight Machinery Company, W. B. 3 |
| G | |
| Gairing Tool Company | L |
| Gaten Rotary Bushing Company 258 Gisholt Machine Company 58-178 Goodman Manufacturing Company 323 Gordon and Morgan Machine Company 222 Gorton Machine Company 600 Gorton Machine Company 600 Gorton Machine Company 600 Gorton Machine Company 600 Gray Company, 600 Gray Company, 61 Gray Company, 62 Gray Company 54 Greenerd Arbor Press Company 314 Grinders & Fixtures, Inc. 379 Griswold Manufacturing Company F. T. 408 Grob Brothers 314 Grobe File Company 67 Grob Brothers 372 Grob Brothers 372 | L & J Press Corporation 238 IW Chuck Company 8 Landis Machine Company 184 Landis Tool Company 12-11 Lapeer Manufacturing Company 34 Last Word Sales Company 26 LeBlond Machine Tool Company 13-13 Lee Company 40 Lees-Bradner Company 41 Lehmann Machine Company 19 Lewithwaite Machine Company 41 Lincoln Electric Co. 10 Lincoln Industries 8 Linley Brothers Company 39 Lufkin Rule Company 21 |

Before You Buy Machine Tools Visit the 1st INTERNATIONAL

Write for FREE
Subscription of
Machine Tool Review
Official Exposition
Publication

MACHINE TOOL EXPOSITION

The World's Only Permanent Machinery Exhibit



EXHIBITION HALL 132 54th Street, Brooklyn 32, N. Y.

Open doily: 10 A.M. to 6 P.M. - Sat.: 9 to 1

M

| Machine Products Corporation237 |
|---|
| Machine Tool Publications409 |
| Madison-Kipp Corporation |
| Manhattan Rubber Division |
| (Raybestos-Manhattan, Incorporated) 76 |
| Martin Machine Company, J. E352 |
| Master Mfg. Co |
| Masters407 |
| Maxwell Company34 |
| MBI Export & Import, Ltd 87 |
| McCrosky Tool Corporation |
| McDonough Manufacturing Company246 |
| Metal Carbides Corporation |
| Metallizing Engineering Company |
| Michigan Chrome & Chemical Company31 |
| Michigan Drill Head Company 78 |
| Micro Drill Guide and Engineering Company 376 |
| Microtrue Company |
| Midwest Tool & Engineering Company369 |
| Miller Fluid Power Company |
| Milne and Company, A Inside back cover |
| Modern Industrial Engineering Co 35 |
| Modern Tool Works |
| (Div. Cons. Mch. Tool Corp.) 85 |
| Mojave Granite Company355 |
| Moline Tool Company30 |
| Morris Machine Tool Company |
| Morse Twist Drill & Machine Company18-19 |
| Motch and Merryweather Machinery Company 49 |
| Motor Tool Manufacturing Company |
| Mummert-Dixon Company415 |
| |

0

| .К. То | ol Compan; | | | | | | | | | | | .409 | |
|----------|------------|----------|---|-----|----|-----|---|------|--|------|--|------|--|
| liver I | nstrument | Compan | y | | | | | | | | | . 30 | |
| 'Neil-I | rwin Manu | facturin | 8 | Cor | np | anj | 7 | | | | | .150 | |
| ttemille | er Compan | v. Wm. | H | | | | | | | | | .375 | |

P

| Palley Supply Company | 39 |
|--|-----|
| Pedrick Tool and Machine Company | |
| Pelron Corporation | |
| Pines Engineering Company | |
| Pivot Punch and Die Corp34 | |
| Plunket Machine Company, J. E | |
| Pope Machinery Corporation | 12 |
| Porst Brothers Manufacturing Company19 | 2-1 |
| Portage Double-Quick Tool Company | 12 |
| Porter-Cable Machine Company | |
| Portland Machine Tool Works, Inc | |
| Potter and Brumfield | |
| Preis Engraving Machine Company, H. P | |
| Pressure Handle Company | |
| Procunier Safety Chuck Company | |
| Producto Machine Company | |
| | |
| Prutton Machinery Company, D. H | |
| Putnam Tool Company | |
| Pyrometer Instrument Company | 37 |

N

| National Acme Company |
|--|
| National Broach and Machine Company 68 |
| Nelco Tool Company |
| New Departure Division |
| (General Motors Corporation) |
| New Hermes Engraving Machine Corporation36 |
| New Method Steel Stamps, Incorporated27 |
| New Plastic Corporation 4 |
| Niagara Machine and Tool Works24-2 |
| Nichols-Morris Corporation 8 |
| Nicholson and Company, W. H30 |
| Nielsen, Incorporated20 |
| Nilsson Gage Company |
| Nirol Manufacturing Company |
| Nobur Manufacturing Company |
| Nolan, Edward J |
| Norton Company |
| Northwestern Tool & Engineering Company35: |
| Molthwestern 1001 or Engineering Company |

Q

| Queen | City | Machine | Tool | Company | ***************** | 5 |
|--------|------|---------------|--------|---------|-------------------|---|
| diamen | 0.00 | Man meritaine | a cons | Company | | - |

R

| R and L Tools | | | | | | | | | | | 28 |
|----------------------|---------|------|-----|-----|---|------|--|--|-----|---------|-----|
| Rahn Granite Surface | Plate | Con | npa | ny | | | | | | .3 | 69 |
| Baybestos-Manhattan, | | | | | | | | | | | |
| (Manhattan Rubber | | | | | | | | | | | |
| Raymond Corporation | | | | | | | | | | . 2 | 82 |
| Reading Machine Com | pany | | | | | | | | × . | .3 | 08 |
| Reid Brothers' Compa | any, Ir | COTE | юга | tec | 1 | | | | | .2 | 42 |
| Daw Madel Banta Com | | | | | | | | | | - | 100 |

TRIPSOURTAPPING



with the World's Fastest

3 Spindle Tapper

Prutton TAPMASTER

- ★ Save 2/3 of tapping costs!
- ★ Save 1/2 of your floor space!
- ★ Save 65% of manhours!

Send for latest Bulletins and Price List

P.H. Prutton
MACHINERY CO.
5295 WEST 130TH STREET
CLEVELAND 11, OHIO

Better Than 3 Tapping Machines In one

More efficient, versatile. Exclusive— Three spindles for multiple hole tapping up to 1800 pieces per hour.

Replaces three ordinary machines. One operator replaces three. Only Prutton taps from the bottom—underneath the work. Remove work easier, safer, faster. No chip problems! Pressure jets direct coolant on cutting edges continuously. Chips wash down and out. No need to "blow" them out. Taps last longer—no sticking, snapping off in work. Get better threads. Tap blind holes to depth. These are only a few of the advantages. Models 10, 20, 30 are lead screw type. Model 40 is cam actuated.

Model 10 taps $\frac{3}{4}$ " to $\frac{7}{4}$ " dias., 1000 to 1800 pcs. per hr Model 20 taps $\frac{7}{3}$ " to $\frac{1}{2}$ " dias., 450 to 1000 pcs. per hr Model 30 taps $\frac{1}{2}$ " to $\frac{4}{2}$ " dias., 300 to 500 pcs. per hr Model 40 taps $\frac{1}{2}$ " to 4" dias., 300 to 500 pcs. per hr Model 40 taps $\frac{1}{2}$ " to 4" dias., 400 to 700 pcs. per hr

| Richards Company, J. A. 118 Rickert-Shafer Company 346 Rimat Tool Company 294 Rivett Lathe & Grinder, Inc. 79 Robbins Company, Omer E 312 Rocheleau Tool and Die Company 114 Rockford Machine Tool Co. 208 Roll Feeds Corporation 335 | Tilp, Incorporated, J. G. 407 Tree Tool and Die Works 399 Trison Manufacturing Company 15 Troyke Manufacturing Company 274 |
|---|---|
| Ross Operating Valve Company | U |
| Royal Oak Tool and Machine Company Back cover Royal Press Company 197 Ruthman Machinery Company 265 Ryerson and Son. Incorporated, Joseph T. 152 | U. S. Burke Machine Tool Company 392 United States Drill Head Company 259 U. B. Steel Supply 22 U. S. Tool Company 73 Universal Engineering Company 232 |
| | |
| | |
| S | V |
| 8 & S Machinery Company 324-333 Sales Service Machine Tool Company 36 Scherr Company, Inc., George 352 Scherr Optical Tools, Inc., George 328 Schmidt, Incorporated, Geo. T. 102-172 Schrader's Son. A. 93 Schults and Anderson Company 268 | Van Keuren Company 110 Vogel Tool and Die Corp 359 Vulcan Tool Company 124 |
| Seibert and Sons, Incorporated | W |
| Shearcut Tool Company | Walker Company, O. S. .365 Walker-Turner Division (Kearney & Trecker Corp.) 310-311 Walls Sales Corporation .300 Waitham Machine Works .275 Wardwell Manufacturing Company .338 Warner & Swasey Company .77 Watts Brothers Tool Works .352 Wesson Metal Corp. .244 Wesson Products Company .369 Western Tool Supply Company .389 Whit Dental Manufacturing Company .369 White Dental Manufacturing Co, S. S. .204 Whitnen and Barnes .99 Whitnen Manufacturing Company .368 Whitnon Manufacturing Company .368 Whitnon Manufacturing Company .210 Wiezo Machine Corporation .378 Wiedemann Machine Company .106 Wilson Mechanical Instrument Division (American Chain and Cable Co.) .241 Wohlnip Engineering Company .330 |
| | Ý |
| | Yoder Company |
| T | Yost Manufacturing Company |
| Tamms Industries, Incorporated306 | |
| Tannewitz Works | |
| Thompson Grinder Co | Z |
| Thriftmaster Products Corporation | Zagar Tool Inc300 |



Be sure to see the New Milne Exhibit Booth 429-A. S. T. E. Show-Phila.-April 26 - 30.

Finally - A FIXTURE THAT MAKES FORM RELIEF PRACTICAL!



THE NEW
ROYAL OAK
UNIVERSAL
FORM RELIEVING
FIXTURE

TAPS • SPHERICAL CUTTERS • PROFILE MILLS
REAMERS • COUNTERBORES • HOLLOW MILLS
CENTER DRILLS • STEP TOOLS • BORING BARS

Increased life, better performance for practically all end and side cutting tools is now possible. New design gives traverse, not rocking, action with tool remaining on wheel center. Set-up so fast and simple you can standardize on this better grind for tools of 1 to 16 flutes. Easy cam interchange — selective degree of relief without changing cams.

WRITE FOR CATALOG

AXIAL RELIEF ONLY

ANY COMBINATION

OF AXIAL AND

RADIAL RELIEF

GRINDER DIVISION

ROYAL OAK TOOL & MACHINE CO.

29800 STEPHENSON HY.

ROYAL OAK, MICH.